DOMESTIC ENGINEERING

VOL. 26. NO. 8. Chicago MAY TWENTY-FIFTH, NINETEEN HUNDRED AND FOUR New York WHOLE NO. 175

NEW YORK, BOSTON, MINNEAPOLIS, DENVER
PHILADELPHIA, ST. LOUIS, LONDON, HAMBURG

AMERICAN RADIATOR CO. GENERAL OFFICES LAKE & DEARBORN STS. CHICAGO.

"GLAUBER"

always

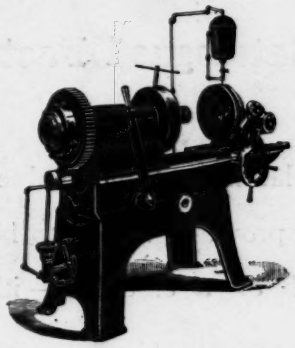
GUARANTEES

absolute

SATISFACTION.

GLAUBER BRASS MFG. CO.
Plumbing and Water Works Goods
CLEVELAND, OHIO

Williams No. 3 Pipe Machine



Is a strong substantial tool that will cut and thread pipe from 1½ inches to 6 inches. It is a rapid worker, is equipped with Quick Opening Adjustable Dies and has six changes of speed without removing or replacing gear. *Send for Circulars and Prices.* We build Pipe Machines cutting from 1-4 to 12 inches.

WILLIAMS TOOL CO., ERIE, PA.

WHAT A DIFFERENCE

In the quality of Plumbing work.

RAYMOND'S

COMBINATION FERRULES MAKE RELIABLE CONNECTIONS BETWEEN LEAD AND IRON PIPES.

WHY?

Because they have an extra thickness of lead over the shoulder, giving strength where it is needed, and where other Lead Ferrules are weak.

The genuine article bears our label.

RAYMOND LEAD COMPANY, CHICAGO.

FOR 25 YEARS The World Has Known the Excellence of Crosby Steam Appliances, None so Efficient and Durable. Design and Workmanship Unrivalled **CROSBY** STEAM GAGE & VALVE CO. BOSTON. NEW YORK. CHICAGO.

CROSBY SPRING-SEAT GLOBE and ANGLE **VALVES** All Parts Interchangeable All Parts Renewable Tested for Highest Pressures **LEAK-PROOF** CROSBY STEAM GAGE & VALVE CO. Boston. New York. Chicago **UNION**

20,000 CONTRACTS would be considered a good record. We have lighted over that number of Churches alone in all parts of the world. A pretty sure guarantee of satisfactory work. Correspondence Invited.

I. P. FRINK, 551 Pearl St., NEW YORK

JENKINS BROS.' VALVES

Honestly manufactured. Fully guaranteed. To be sure that you are getting the genuine, see that the valves you buy are stamped with Trade Mark as shown in the cut.

Jenkins Bros., New York, Boston, Philadelphia, Chicago, London

PATTERNS
GOBEILLE PATTERN CO. Cleveland, O.

Did you ever see a junk heap?

$6.00 Net.

It usually contains out-of-date machines and tools of every kind. *Did you ever see a first-class money making business using junk in the shape of machines or tools?* Never. *Only unsuccessfull people do that.* There is only one good place for worn out or out-of-date machines or tools and that is the junk heap. Are you using junk for tools thinking you are saving money by so doing? If so, *think it over.* Send for our catalog—it tells all about fire pots and torches. *Our guarantee "Your money back if you are not pleased" covers the line.* Jobbers sell at factory price.

Clayton & Lambert Mfg. Co., Detroit, Mich.

SMOOTH-ON JOINTS

A silicated Iron Cement for connecting Bell and Spigot Cast-Iron Soil Pipe in place of Lead.

One-half the cost of Lead.

Joints are easily and quickly made. Sold in 5, 10 and 25 pound red labeled tins.

WRITE FOR CATALOGUE AND PRICES.

Smooth-on Mfg. Co.

572-574 Communipaw Avenue, Jersey City, New Jersey.

CHICAGO OFFICE: - 61-69 N. Jefferson Street, Chicago, Illinois.

PATTERNS
OF EVERY DESCRIPTION
PENN PATTERN WORKS, CHESTER, PA.

"ABC"
FAN **H&V** SYSTEM
FANS AND BLOWERS FOR ALL USES
AMERICAN BLOWER CO
DETROIT.
NEW YORK
CHICAGO LONDON

USE A RED CROSS FILTER AND BE HEALTHY — FILTER

Our New Catalogue

tells you all about automatic flushing and cooling,—the new principle of domestic filtration, as embodied in the

RED CROSS FILTER

Plumbers are coining money installing Red Cross Filters. Sit right down and send for catalogue.

METROPOLITAN FILTER COMPANY
183 WASHINGTON ST., CHICAGO, ILLINOIS

F. E. Cudell's Sewer Gas & Backwater (Patented) **TRAP**

FOR Wash Bowls, Sinks, Bath and Wash Tubs.

S+S+S R. B.

Put into the White House by the United States government.

For Venting se Vent Trap **Cleveland, O.**

Catalogued Facts.

Every claim for Boiler value which a user can not easily prove as stated to him, is as worthless as a bib on a chicken, — it's worse than useless.

Ideal Sectional 36 inch Steam Boiler.

House owners find such satisfaction in using IDEAL Boilers that after proving our catalogued statements they are glad to recommend the work and judgment of the Dealer who sold them.

IDEAL Boilers
IDEAL Tank Heaters
AMERICAN Radiators

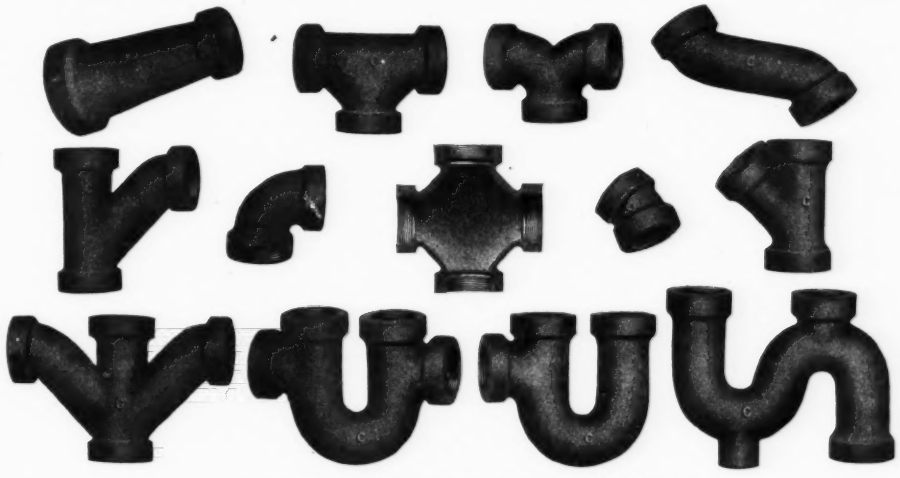
AMERICAN RADIATOR COMPANY

282-284 Michigan Avenue, Chicago

NEW YORK, 42-44 E. 20th Street. BOSTON, 44 Oliver Street. PHILADELPHIA 622 Arch Street.
BUFFALO, 206 Mutual Life Building. WASHINGTON, 1201 G St., N. W.
CINCINNATI, 336 W. 4th Street. PITTSBURG, 926 Farmers' Bank Bldg. ST. LOUIS, 207-209 N. Tenth Street
MILWAUKEE, 126 Sycamore Street. MINNEAPOLIS, 204 4th Street, South.
DENVER, 831 Fifteenth Street. SEATTLE, 502 Lumber Exchange. OMAHA, 417 S. Fifteenth Street.

CRANE DRAINAGE FITTINGS

WE CARRY A COMPLETE STOCK OF BLACK AND GALVANIZED DRAINAGE FITTINGS



MALLEABLE IRON DRAINAGE FITTINGS MADE TO ORDER

WRITE FOR COMPLETE POCKET CATALOGUE

CRANE CO.

CHICAGO

ESTABLISHED 1855

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ST. LOUIS
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SAN FRANCISCO
SALT LAKE CITY
WATERTOWN, S. D.
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MODERN DEMANDS

207–D.

Embossed Solid Porcelain High Tank

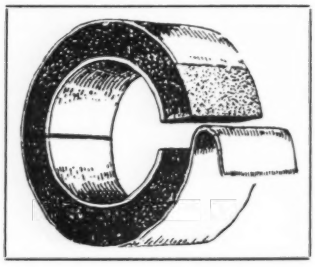
Made with porcelain syphon valve integral with tank. No lining to corrode or be affected with electricity. Will properly operate syphon jet, syphon action wash-down, washout-closets, made plain; also low tank.

MODERN demands in domestic engineering are exacting to a degree. The success of the T. P. Co's goods is largely due to the fact that they anticipate these demands, especially in relation to sanitation and attractiveness of appearance.

TRENTON POTTERIES CO.

Trenton, N. J.

SELLS TO JOBBING TRADE EXCLUSIVELY.



That's It

"The best Asbestos Magnesia Moulded Covering on the Market."

That's what our friends say, and we sell so much of it, that we are beginning to think so, too.

We also Manufacture

Wool-felt covering, any thickness; Air-cell covering, any thickness;
Cold water covering, any thickness;
Several grades of Asbestos and Magnesia cements.

Prompt Shipments.

Write for catalog and prices.

Norristown Covering Co.

Main Office and Works, Norristown, Pa.

BRANCHES:

Boston,	New York,	Baltimore,
411 Atlantic Avenue.	210 Water Street.	208 W. Saratogo St.

REASONS Why Plumbers Should Buy Our Supplies

GOODS SHIPPED PROMPTLY.

WHEN you are in a hurry it is most aggravating to have your orders delayed by small stocks, mixed invoices or unaccommodating shippers. The non-arrival of goods, which you have every reason to expect upon a certain date, often means a considerable pecuniary loss to you. None of these troubles will happen when you do business with us. We carry an enormous stock of goods and can ship your order promptly, whether a few items or a carload. All orders shipped promptly. Every shipment is examined and checked by three different parties before being sent forward. We realize that time is as valuable to you as it is to us, and we make a special effort to be prompt and correct. Your assurance of satisfaction with us simply requires the telling of what you want.

"We Have It"

FLECK BROS. CO.

PHILADELPHIA

Office & Store 44-50 N. 5th St. **Lead Works & Warehouse** 1641-45 American St.

The Roman Bibb has only four parts, a full flow of water can be secured with only one turn of the handle, and it is the only bibb which will not cause the water to spatter. A sample bibb will be sent by mail on 30 days' trial and if you don't think it the best bibb you ever saw it can be returned at our expense.

COLONIAL COMBINATION

Vitreous syphon jet, shaped seat and lid. Colonial tank 10 oz. copper compound lever ball cock. Write for Prices.

MENTION DOMESTIC ENGINEERING

Another New Addition to our "High Grade" Line

"PARAGON"

PATENT

Ground Key Work

Patented February 7th, 1899. OTHER PATENTS PENDING

F U L L
WATERWAY

ABSOLUTELY
DUSTPROOF

GRINDING
THE BEST

F U L L Y
GUARANTEED

Weight Exceeded
By None

The Very
Best of Metal

New Features
Adding Greatly
To Strength

Tested to 200 Lbs.

As will be observed, the manner of fitting the cap on the body instead of the plug is a new feature. This insures greater bearing surface, consequently much more strength. Our cap is absolutely dust-proof. No open holes or slots being necessary.

OUR GUARANTEE

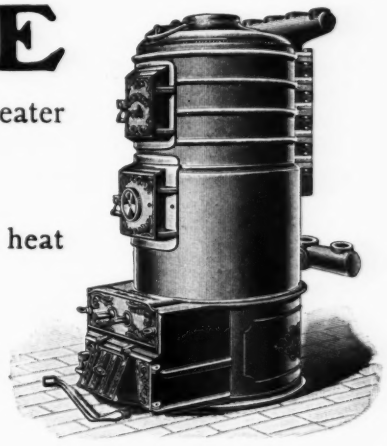
The trade knows our reputation as manufacturers of "High Grade" goods. We can't afford to put a new article on the market that is inferior. We know our PATENT "PARAGON" GROUND KEY WORK has advantages over other makes, and possesses none of their defects, and it is with the greatest confidence that we introduce this new line to the trade, guaranteeing every piece of goods to be strictly first-class in every respect.

The Sanitary Company

Manufacturers of "Paragon" Plumbers' Brass Goods

1-9 Water Street, CLEVELAND, OHIO

ALL INCLUSIVE



You're in a position to know what people demand in heater construction. Do they seek economy in operation?

You Have It In "Gurney" Heaters.

Do they seek exceptional efficiency,—the greatest heat from the fuel consumed?

"Gurney" Heaters are Famous in that Respect.

Do they seek durability, that feature which actually reduces cost of the heater?

"Gurney" Heaters Wear Longer Than Others.

Add to all this the fact that "Gurney" Heaters are simple in construction, easy to operate and no more expensive than many inferior makes, and you know why they prove the strongest trade attractions.

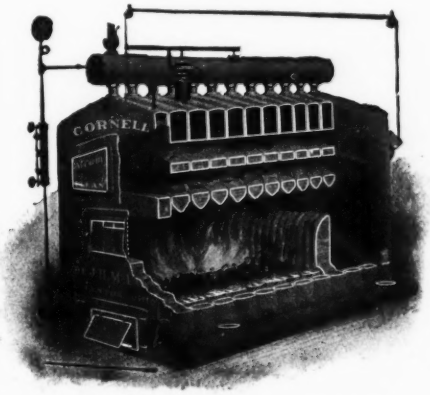
Capacities fully guaranteed. Write us about an agency. At the same time we'll send latest catalogue.

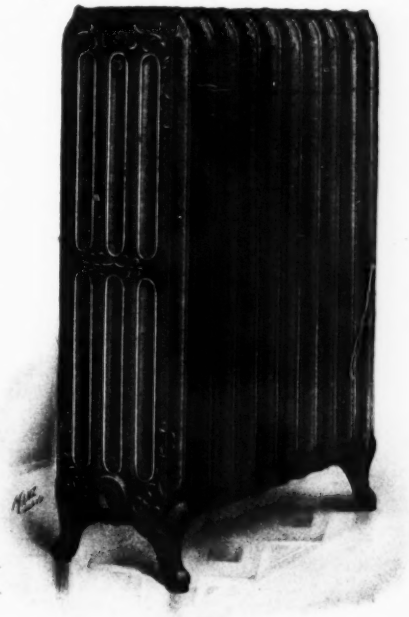
Gurney Heater Mfg. Co.

74 Franklin St., BOSTON.
111 Fifth Ave., NEW YORK CITY.

Worth Something to You.

We think the money, experience and energy we have put into the heating question ought to be worth something to you; this is proven to us by the continued endorsement—and trade—of the critical Steam and Hot Water fitters of this country. The men who investigate, who think for themselves, have doubled the sale of "CANTON" Boilers and "SENECA" Radiators during the past year—and *this* means something. It means that the numerous advantages of construction and principle embodied in our boilers and radiators are apparent and convincing to both the Fitter and his Customer Your own interests demand your careful consideration of our line.





HOT WATER AND STEAM BOILERS IN A VARIETY OF STYLES AND CAPACITIES.

The J. H. McLain Company

WORKS & GENERAL OFFICE, CANTON, OHIO

Branches:—Cleveland, Indianapolis.
Crane Co., Western Selling Agents.
John Simmons Co., New York Selling Agents.

MORE BUSINESS

A Hint

No method of house warming gives more uniformly satisfactory results than the use of a HOT WATER SYSTEM. This is especially true where a building is exposed and where it has many L's and bays.

Even small houses can be heated at a moderate expense by using our round

International Boilers.

A Suggestion

But there are thousands of homes, compactly built and well arranged that can be heated perfectly with much less expense with our HIGH GRADE WARM AIR FURNACES.

It brings the price within the owner's means.

You will not let prejudice in favor of Hot Water blind you to the profit possibilities of Warm Air.

International Heater Company

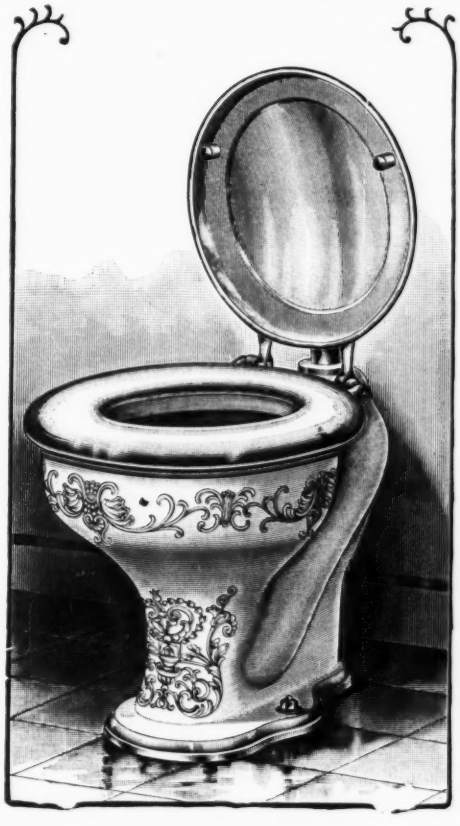
Makers of Boilers and Furnaces

New York Boston **UTICA, N. Y.** Chicago Denver

ENGINEERING & STEAM SUPPLIES CO., Northwestern Agents, Minneapolis, Minn.

The Improved Hygienic Seat

The latest, best and only sanitary Seat on the Market.



The proper Seat to use in all public and private buildings.

The seat and cover are each single pieces of steel stamped under heavy pressure into proper shape, and connected by malleable hinges which are riveted to both seat and cover. These seats are enameled in white making them marvels of beauty.

The undersurface of the Hygienic Seat is concave, making the inner edge form a drip so that any accumulated moisture drops into the bowl and prevents the formation of the black and filthy surface usually found on the undersurface of wood seats. One of the first impressions conveyed to the mind when this seat is presented is that it must be cold and disagreeable. Practical tests, however, have demonstrated beyond a doubt that in this respect they are in no wise different from wood seats. It is perfectly hygienic as its name implies, because it is absolutely moisture proof. Being made of steel and coated with a water-proof white enamel baked on it, it is non-absorbent. It will not split and it has no creases or corners that cannot be wiped off easily the same as earthenware. The enamel is not injured by the washing or scrubbing that removes the varnish from the wood seat.

Orders filled promptly. Prices and further particulars on application.

THE HYGIENIC SEAT COMPANY

139 BEAUBIEN STREET **DETROIT, MICH., U. S. A.**

Read this

Syracuse, N. Y., Sept. 7, 1901.

Monash-Younker Co.,
Chicago, Ill.

Gentlemen:- I have used a great number of your Perfected Duplex #6 Lock Shield Automatic air valves and have always found them to be a first class working valve. They have given the best of satisfaction.

Very truly yours,

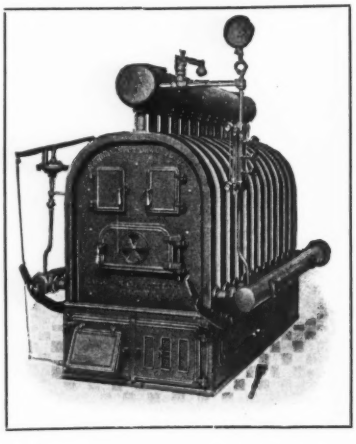
Fitter Edward Joy.

Monash-Younker Co.

MAKERS

43 Centre Street, New York 203 S. Canal Street, Chicago

MAHONY BOILERS



EMBODY

All the Best Features

IN BOILER CONSTRUCTION

They are the intelligent outgrowth of many years of practical experience.

The Mahony Vertical Section Boilers

are dependable. Large effective heating surface, in direct contact, and straight waterways, vertical throughout, make it easy for a Mahony Sectional to deliver

Hot Water or Steam up to the Full Rating

Our Catalogue tells all about them briefly and entertainingly.
IT'S YOURS FOR THE ASKING.

Mahony Mfg. Co., Manufacturers, Troy, N.Y.

NOTICE!

Users, Plumbers, Jobbers and Manufacturers of Syphon Jets and Syphon Hoppers.

United States Letters Patent No. 425,416, granted to Robert Frame and Charles A. Neff, April 15, 1890 controls broadly the siphonic principle in all closets, and as is well known these closets, i. e., syphon jets and syphon hoppers, are the most sanitary and satisfactory closets now on the market.

The undersigned have secured the exclusive license to manufacture and use, and license others to manufacture and use this Patent, and licenses under it have been secured by the following named Sanitary Earthenware Manufacturers:—

The Acme Sanitary Pottery Co., - - - Trenton, N. J.	John Maddock & Sons, - - - - - Trenton, N. J.
The Bellmark Pottery Co., - - - - - Trenton, N. J.	Thos. Maddock's Sons Co., - - - - Trenton, N. J.
The Brian Pottery Co., - - - - - - Trenton, N. J.	Sanitary Earthenware Specialty Co., - - Trenton, N. J.
Camden Pottery Co., - - - - - - Camden, N. J.	Standard Sanitary Pottery Co., - - - Elizabeth, N. J.
Elite Pottery Co., - - - - - - - - Trenton, N. J.	The Trenton Potteries Co., - - - - - Trenton, N. J.
Fidelity Pottery Co., - - - - - - Trenton, N. J.	Universal Sanitary Mfg. Co., - - - New Castle, Pa.
The Great Western Pottery Co., Kokomo, Ind , and Tiffin, O.	The Wheeling Potteries Co., - - - Wheeling, W. Va.
Ironside Pottery Co., - - - - - - Bordentown, N. J.	The Willets Mfg. Co., - - - - - - Trenton, N. J.
Keystone Pottery Co., - - - - - - Trenton, N. J.	Mercer Pottery Co., - - - - - - Trenton, N. J.

No other Sanitary Earthenware Manufacturers than the above are authorized to make or sell syphon jets and syphon hoppers, and any person **making, selling** or **using** such closets made or sold by any unlicensed manufacturers will be liable to prosecution for past as well as future infringements.

POTTERIES SELLING CO., - Trenton, N. J.

Every Heater Guaranteed.

We Are Helping You

ALL THE TIME
to Sell

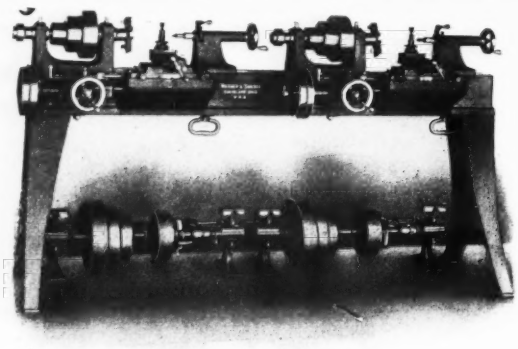
HUMPHREY CRESCENT INSTANTANEOUS WATER HEATERS

NOW we are running a series of advertisements in the best magazines starting with the April numbers—we refer all inquiries to you. To take full advantage of this extensive publicity, every Plumber should have one or more heaters in stock.

Better Send Today for Catalogue and Prices.

HUMPHREY CO. Kalamazoo, Michigan

TURRET LATHES
BRASS WORKING MACHINERY



DOUBLE HEAD KEY LATHE
For turning Keys for Steam, Water and Gas Cocks.

1904 General Catalog illustrates and describes our complete line of Brass Working Tools. Mailed upon application.

THE WARNER & SWASEY CO.
CLEVELAND, OHIO.

HOLLAND RADIATORS

Bremen Eclipse
Reliance Unique

Direct, Direct-Indirect, Indirect, Window and all specials

Write us for descriptive matter and prices.

Holland Radiator Co.
Chicago, 38 Dearborn St. Works, Bremen, Ind.

COMPLETE STOCKS CARRIED AT FOLLOWING POINTS:

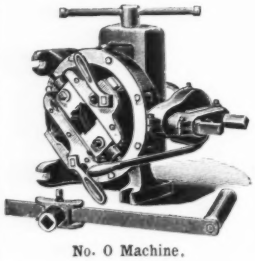
Denver, Colo., Kellogg & Stokes Stove Co.
Kansas City, Mo., U. S. Water & Steam Supply Co.
Indianapolis, Ind., Central Supply Co.
Milwaukee, Wis., The Robert Rom Co.
Cleveland, Ohio, Standard Mfg. Co.
St. Louis, Mo., Miller & Brockman.

ARMSTRONG'S
Pipe Threading & Cutting Off Machines

Armstrong's Hinged Vise, built of malleable iron with steel jaws.

FOR HAND OR POWER

Save time and labor, all moving parts run in oil in a dust and chip proof case.



No. 0 Machine.

We manufacture the
GENUINE Armstrong Stocks and Dies

Complete Catalogue sent on request.

THE ARMSTRONG MFG. CO.
New York City, 139 Centre Street — Bridgeport, Conn.

INTELLIGENT ECONOMY

forbids the purchase of three pumps when you can get ONE that will do the work of three.

THE PERKES

COMBINATION AIR, FORCE AND TEST PUMP

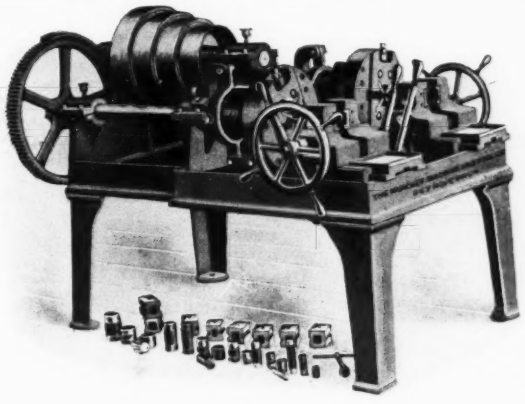
can be used for testing soil pipe, proving gas pipe, and is the best force pump on the market.

No stuffing boxes; all valves are on the outside, and work equally well with air or water.

PATENTED MARCH 18TH, 1898
PATENTED JUNE 18TH, 1901

Send for Complete, Descriptive Circular.

CHARLES PERKES
MANUFACTURER AND DEALER IN PLUMBING SUPPLIES
ESTABLISHED 1858
627-629 Arch Street, Philadelphia



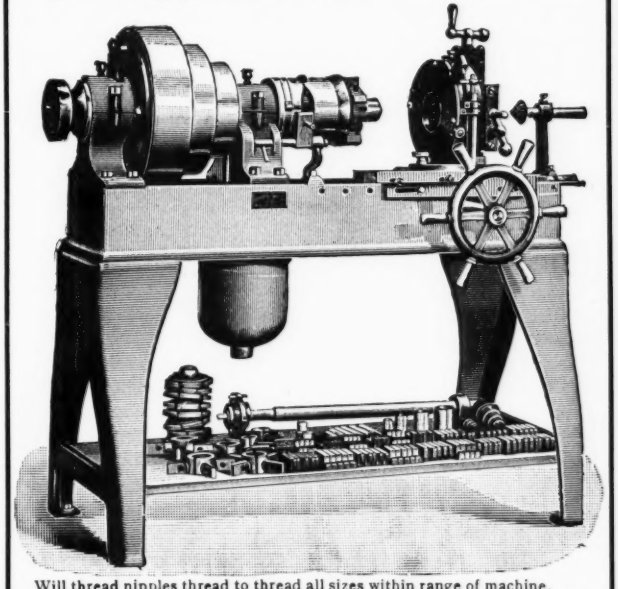
Nipple and Pipe Threading Machine from ½ to 2 inch.

This machine is designed to thread nipples from a close nipple to any length, and is constructed with that special object in view. It is the result of a long and practical experience in this class of work which has led the makers to place such a machine on the market, knowing how slow and inadequate the old style jobbing machine has been for this purpose. Where any large quantity of pipe is to be threaded this machine shown in the cut will do the work in a fourth of the time and do it better than with the old methods.

Write for Descriptive Circular

Manufactured by Kenneth Anderson Mfg. Company,
33-35-37 Atwater Street, DETROIT, MICH.

Apex Nipple and Pipe Mill Machine



Will thread nipples thread to thread all sizes within range of machine.
Equipped with our Standard Adjustable Quick Opening and Closing Dies, allowing cutting off of pipe close to grippers.
Nipple grips can be closed on threaded end of pipe without injuring thread. Only machine on the market with this feature.
Write for catalogue and prices.

MERRELL MANUFACTURING COMPANY
208 Curtis Street, Toledo, O., U. S. A.

The Right Idea!

HAVE A

NATURO

IN YOUR SHOW ROOM

You Want the Booklet, too;

ASK FOR IT

SELLING AGENCIES

New York, N. Y. - - John Simmons Co.
Boston, Mass. - - F. W. Webb Mfg. Co.
Philadelphia, Pa. - - Walls & Pearsall.
Pittsburgh, Pa. - Bailey-Farrell Mfg. Co.
Wilmington, Del., Speakman Supply & Pipe Company
Washington, D. C. - - John Mitchell, Jr.
Baltimore, Md. - Jas. Robertson Mfg. Co.
Birmingham, Ala. - Milner & Kettig Co.
Kansas City, Mo. - U. S. Water & Steam Supply Co.
San Francisco, Cal. - - Geo. H. Tay Co.
Halifax, N.S. - Wm. Stairs, Son & Morrow.

MADE BY

C. H. Muckenhirn, Salem, N. J.

Est. 1869
Inc. 1898

HAYS

The Goods That Please

Water Works', Gas Companies' and Plumbers' Goods.

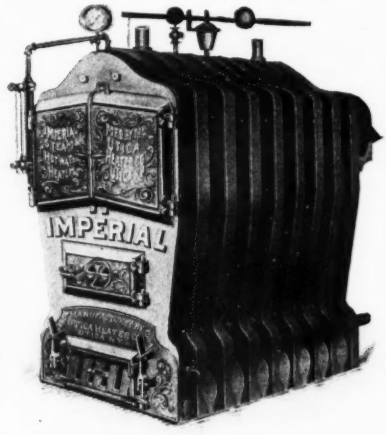
Original McNamara Hydrants and Street Washers.

Hays Manufacturing Co.
ERIE, PA.

Yesterday
Today
Tomorrow
Forever—

Superior Furnaces

Imperial Boilers



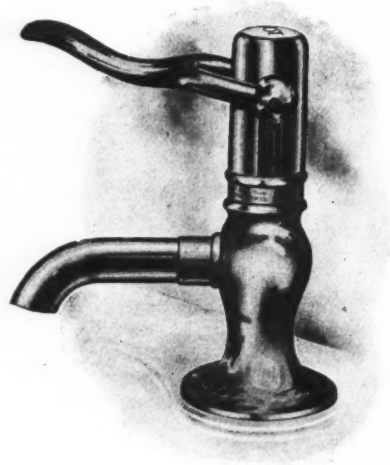
Imperial Sectional Boiler.

STAND THE TEST OF TIME.

Utica Heater Co., Utica, N.Y.

Manufacturers of
IMPERIAL BOILERS---SUPERIOR FURNACES
Send for Catalogues

CHICAGO HEATER & SUPPLY CO.
Chicago Agents. 33 Dearborn Street.



The Broughton Self-Closing Basin Cocks have been in use for many years. Some of the largest Hotels and Public Buildings in the United States are equipped with these goods. Made in Brass, Nickel or Silver Plated, and in Solid Silver-Metal.

EVERY ONE WARRANTED

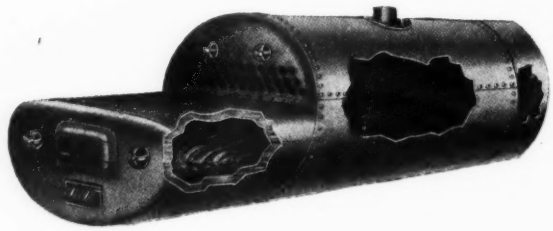
Manufactured only by

E. Stebbins Manufacturing Co.
SPRINGFIELD, MASS.
WORKS AT BRIGHTWOOD.

Save Your Customer

At least 50 per cent in Fuel by installing our

"Invincible" OR "Eclipse"
STEEL HEATING BOILERS



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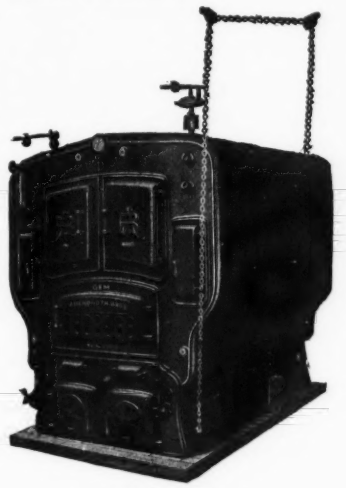

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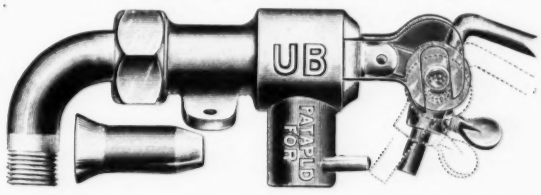

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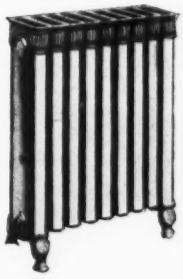

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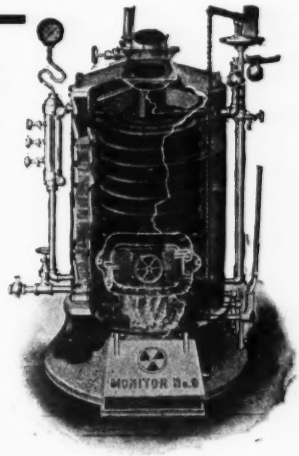

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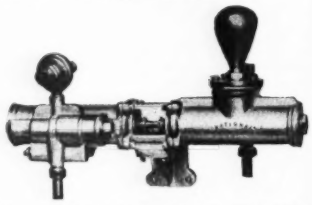

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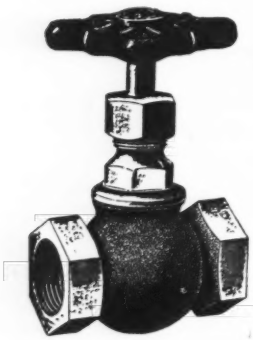

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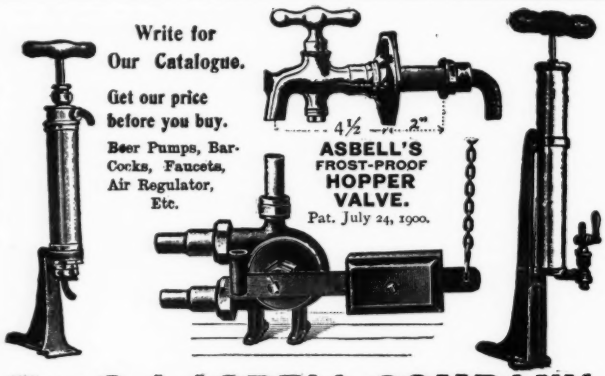

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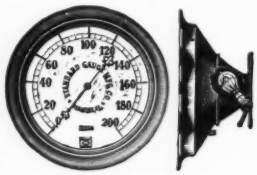

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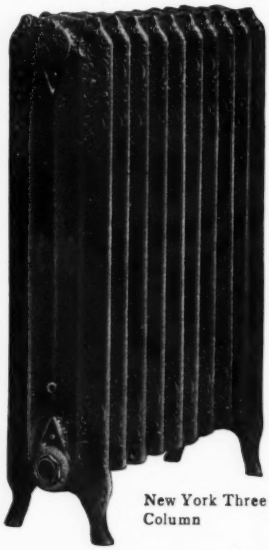

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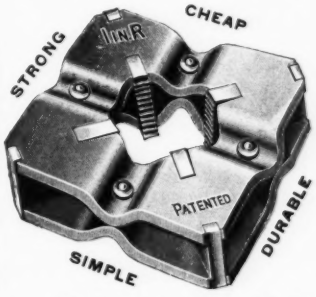

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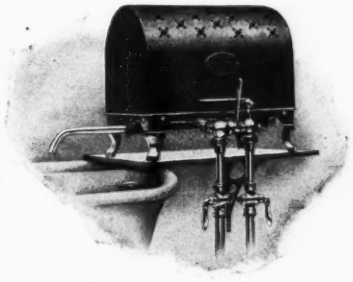

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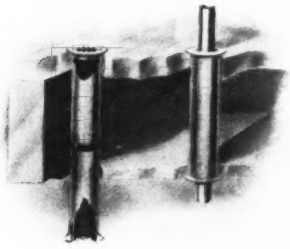

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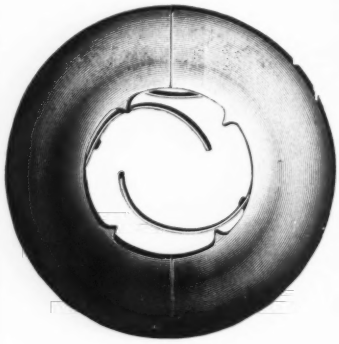

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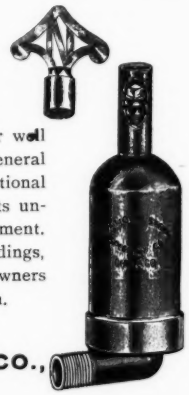

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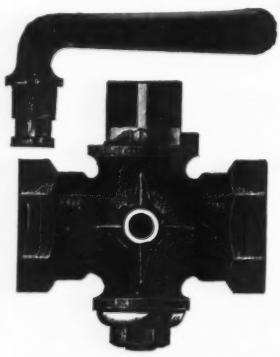

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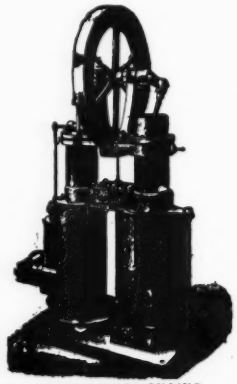

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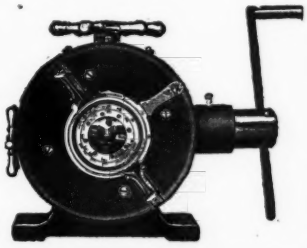

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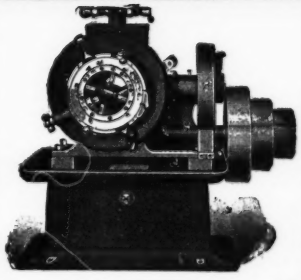

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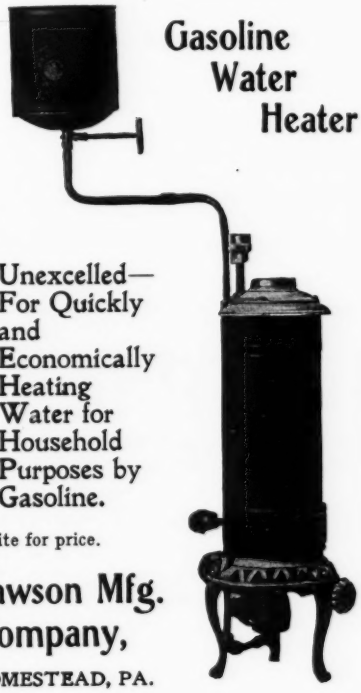

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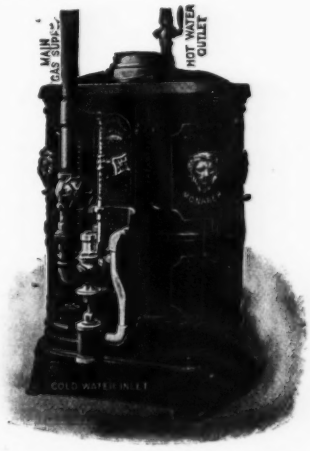

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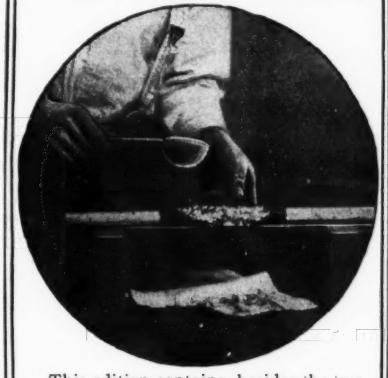

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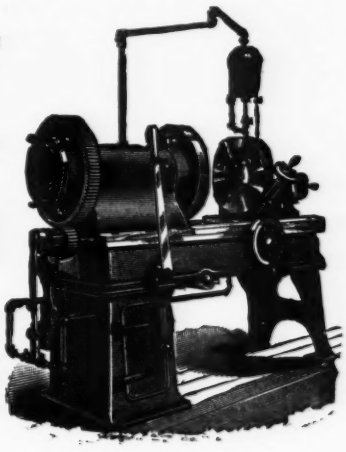

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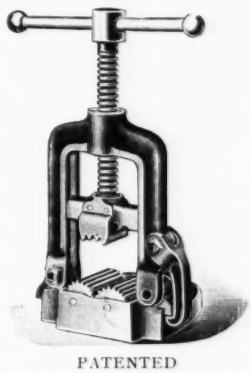

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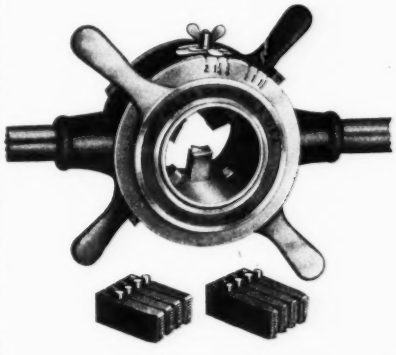

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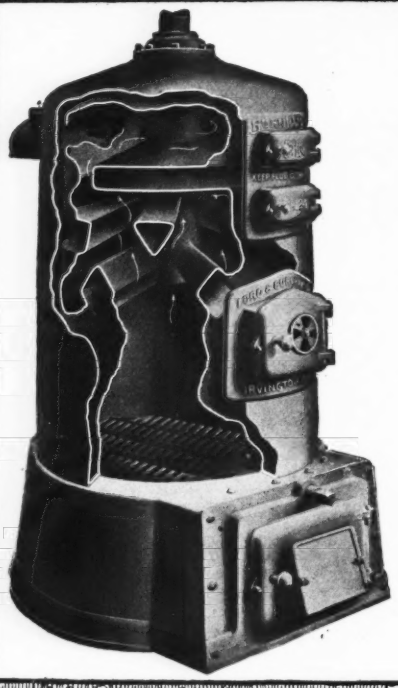

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Whole No. 175 *MAY TWENTY-FIFTH, NINETEEN HUNDRED AND FOUR* *Vol. 26, No. 8*

SEWAGE DISPOSAL.

By Prof. W. S. Leavenworth. *

THE natural increase in population and the tendency of the people to mass at certain localities have introduced sanitary problems which had attracted little attention in this country a generation ago. Most cities have sewerage systems which remove the waste from the immediate locality only in many instances to become a nuisance and a menace to such neighboring towns as receive their drainage.

PROF. LEAVENWORTH.

In many states the law prohibits the fouling of streams, ponds and lakes by the free discharge of sewage therein, as a protection to sources of water supply. The purity of our public water supplies demands that our municipalities shall make such a disposal of their domestic and manufacturing waste as not to endanger the health of, or give offense to, the immediate neighborhood or to near by communities.

This demand has resulted in the adoption of various methods of sewage disposal which have been of great use in developing our knowledge of sanitary science and in improving our water supplies.

The object of sewage disposal is to treat the sewage in such a way as will permit the turning of the product or effluent into our waters without danger of pollution or of giving offense to sight or smell.

Sewage, strictly speaking, consists of the city waste flowing through our sewers. We classify it as either domestic or manufacturing sewage. The former contains human and animal excreta, washings from the bath, house and kitchen and perhaps storm water. The latter consists of waste from dye works, woolen mills, tanneries and pulp mills and the like, and often contains chemicals, coloring matter and other substances, which frequently interfere with its purification. These may or may not be mixed with ordinary sewage. Factory waste should be cared for by the producer and sometimes contains enough of value to pay for its treatment.

Domestic sewage contains approximately six pounds of solids in one thousand gallons, and about one hundred and forty or fifty million bacteria per ounce. The sewage contains organic and mineral matter in about equal amounts. The organic part is both in suspension and in solution. The ordinary sewage looks like very dirty dish water and contains all sorts of refuse, such as bits of wood, rags, paper, vegetables, fruits, starch sugar, meat, soap and fats, as well as certain other nitrogenous substances which may be infected with organisms, capable of conveying disease or which may give rise to a serious nuisance, contaminating air and water and thus becoming inimical to the comfort and health of the people. Fortunately, nature has provided, through the agency of bacteria, a remedy by which the noxious organic matter is changed into harmless inorganic substances.

In determining the best method of treatment of a sewage it is subjected to a chemical and bacteriological analysis, but before doing this certain preliminary observations are made which are of great aid in ascertaining the general character of the sewage.

The volume of the sewage is practically the water supply of the city plus the ground water. The volume, and consequently the flow, should be gauged, since it varies with hour, day and season. The dry weather flow is taken as the standard, and is estimated by weiring the output of the trunk sewer.

Samples for examination are taken hourly and the temperature of the affluent and effluent noted. The character of the scum and sediment is observed as well as the color and color changes which the sewage undergoes in process of treatment. The odor of the sewage varies with its age and treat-

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HOW THE "HELPERS" DROVE HIM TO DRINK.

He dashed into the booze barracks, dragging with him a face looking the picture of despair, and never stopped until he was beached on the bar. Then in a voice that had all the wriggling emotions of eternal trouble, he piteously cried:

"Give me a Scotch high ball, and give it to me quick! Ah, that is splendid! It helps you to forget. Now mix me a Manhattan, but in the meantime you may give me a little plain rye to fill in the time. After that you may—"

"Say, man," exclaimed the astonished bartender, "have you gone bughouse, or is it just a plain case of pink alligators?"

"Neither," replied the man with the swollen thirst, "I am a victim of the 'helper' habit, and merely want to forget. Don't know what a 'helper' is? Well, then, mix me a Martini and I will tell you.

"You see it was this way. Last night my water pipes froze up and bursted, flooding the cellar and putting the heater out of business. I didn't mind that. It was merely a diversion. The trouble began when I telephoned for the plumber, the mason, and the heater man. They all came in a bunch. The plumber had a boy with him. It was his 'helper.' The heater man also had a kid in his wake. This kid was his 'helper.' The mason brought one of the same breed.

"'Gee whiz, men!' I cried with all the wrath at my command, 'I didn't call out the militia, or even ask for an extra squad of police. What are you going to do with all that force?'

"'You want yer house fixed up, don't yer?' asked the plumber.

"'Yes,' I admitted, 'but I didn't dream that it would take a gang big enough to build a new one.'

"'Well, then, just you go back into the dog house and lay down and we'll do the rest.'

"With that the whole mob started for the cellar, and I followed them down. Give me a whisky sour, please, and put a few railroad spikes in it. As soon as they had looked at the damage the plumber took a chew of tobacco, and his 'helper' did the spitting. The heater man followed suit with a pinch of snuff, and his 'helper' did the sneezing. In the meantime the mason lighted his pipe, and his 'helper' blew out matches.

"Then they decided that they would have to have a carpenter. The carpenter soon came, and was accompanied by a 'helper.' Hardly had he joined the gang before he struck his finger with a hatchet, and the helper did the cussin'. In tearing out the pipe they broke all the glass in a cellar window and then telephoned for a glazier. He soon butted in and was followed by a 'helper.' The glazier put in his time chewing the rag, and the 'helper' carried extra teeth.

"Well, to make a long story short, they had a June picnic down in that cellar all day long, and I furnished the sandwiches and hammocks. Twenty seconds after they had gone I got the bills, and every other item was 'man and helper.'

ment, and the gases produced show the progress of the purification. The chemist first ascertains the reaction of the sample, whether it is acid, alkaline or neutral. This is important as indicating the method which should be used in purifying the sewage. The chemist then determines the amount of free ammonia produced in the process of fermentation, then the albuminoid ammonia, which includes the ammonia obtained from unaltered albuminous compounds of proteids. The percentage removal of this constituent of the sewage largely determines the efficiency of the disposal plant.

The percentage efficiency with which the carbonaceous and nitrogenous matters are oxidized is ascertained by estimating the amount of oxygen consumed in the purification. When all organic matter is oxidized the purification is complete.

The amount of nitrates and nitrites produced by the purification process is a measure of the progress of oxidization when sand beds are used, but these are not formed by the septic tank method.

Bacteria cause the chemical changes produced by the decomposition of the organic matter in the sewage. Probably each impurity has its special bacteria, but for our purpose they are classed as anaerobic and aerobic bacteria. The first grow and thrive without air and light, the second require both air and light for their development.

The bacteriologist counts the number of bacteria in one cubic centimeter of the sewage in order to determine its value as a food for the bacteria. The organic matter serves as food, so the larger the amount of this food the greater will be the number of these micro-organisms present in the sewage. As the purification proceeds the number of bacteria present decreases, because their food lessens, and when all the organic matter is mineralized the bacteria die for lack of food. Bacteria will not grow in water free from organic matter, hence such water is considered safe and is not likely to contain disease breeding substances.

The final result of the bacterial action is to change the carbo-hydrates, such as sugar, starch and cellulose, into carbonic acid gas and into marsh gas. The fats become rancid and are changed to fatty acids and these into soaps and glycerines, which in turn are also gasified.

The nitrogenous organic matter, such as the proteids and other wastes from the animal system, are highly complex and in the process of decay give rise to the objectionable odors and poisonous substances found in putrefying sewage. When the purification is complete the final products are various gases, such as carbon dioxide, carbon monoxide, ammonia, hydrogen, nitrogen and oxygen, also soluble mineral matter, like the nitrates of sodium and potassium.

Nature's method is to take this organic matter which is detrimental to health and life and through the agency of the ever present bacteria to change it into foods which can be taken up by plants and animals; these in turn serve their purpose in the cycle of nature. A good sewage plant aids nature and the better we understand her methods the more successful we shall be in solving our sanitary problems.

The standard taken for the efficiency of a sewage bed varies, but an effluent is considered safe to dump into a stream which absorbs less than 1.42 parts of oxygen and evolves less than 1.42 parts of albuminoid ammonia in a million parts and one which will not putrefy upon standing for one week.

Of course the ideal disposal would be one whose product could be safely used for drinking; however, by intermittent filtration through sand, sewage has been so thoroughly purified that the effluent on analysis proved to be purer than many wells constantly used for drinking purposes.

METHODS OF DISPOSAL.

Primitive man moved when the refuse became objectionable. Settlers threw their waste on the land at their back doors. Later came the use of the cesspool, soon to be followed by the sewerage system which removes the waste from the immediate locality. The first serious attempt towards disposal was by dilution, that is, the discharge of the sewage into streams, lakes or the ocean. This method is endurable where the flow is great as compared with the amount of the sewage and where the water is not to be used for drinking. Dilution should at least be in the ratio of one pai of the sewage to one hundred parts of the water. Even in this process the bacteria is largely the agent of purification, though much is carried to the bottom of the river or lake by subsidence or recipitation, the latter taking place if the water contains lime or other mineral matter, which forms with sewage insoluble compounds. The part which settles is changed somewhat, depending upon its character, into gaseous and liquid products by the anerobic bacteria. Large bodies of water contain in the aggregate much air, which aids oxidization. If too much sewage is added the oxygen of the air is exhausted and the result is injury and perhaps death to the higher forms of water life.

"I withstood the shock, however, until evening, when the preacher called. He was accompanied by a small boy.

"'Mr. Smith,' said the dominie in a donation day voice, 'let me introduce you to one of my little helpers—'

"That was the last straw. It was more than any man could stand. I sped from the house. I needed a nerve tonic, and here I am. Fill 'em up again."—*Philadelphia Telegram.*

THIS IS SUPPOSED TO BE FUNNY.

One of the editor's friends in the classic city of Boston submits the following poem. We regret the modesty which prompted him to send it without signing his name. The meter isn't half bad, but like so many other meters, it gives a slightly unreliable account of the real situation:

NOT THE PLUMBER'S FAULT.

'Twas long ago; a man discerned
A faucet that had not been turned,
And yet it leaked—'twas then he learned
A lesson that he'd fain have spurned—
At sixty cents an hour.

He told a plumber man to come
Down to his house and tinker some.
The plumber said, in accents grum:
"By gum! Of course I'll come and plumb
At sixty cents an hour."

The plumber came and looked about
And viewed the faucet with some doubt;
Then hammered on the water spout,
Sat down and let his whiskers sprout,
At sixty cents an hour.

The water dripped in little pools,
And spattered into wee globules.
The plumber said: "It is the rules
That I must go and get my tools,
At sixty cents an hour."

Next day he came and looked again,
And made some figures with his pen,
And called a couple of his men
To see how it was dripping then—
At sixty cents an hour.

The days wore on, the weeks went by;
The months and years began to fly;
But still the plumber, looking wry,
Came daily in and cocked his eye—
At sixty cents an hour.

And still the water dripped away,
And still the plumber would not stay
More than ten minutes any day—
And he was growing bent and gray
At sixty cents an hour.

At last the man, unsatisfied,
Gave up the ghost—in short, he died
Of old age—then the plumber sighed
And came around and took a ride—
At sixty cents an hour.

The leaky faucet's dripping still
And adding to the plumber's bill.
The plumber has it in his will
That all his heirs their time must kill
At sixty cents an hour.

"I hear th' widdy O'Flynn has married Martin Mahoney at lasht," said Mr. O'Tunder.

"Yis," replied Mr. O'Toole. "They wor married lasht Choosday."

"An' phwhere are they now?"

"Shure, Katie told me this marnin' thot they hove gone away fer their Mahoney-moon."—*Judge.*

Sewage, when discharged into large flowing rivers, is likely to be a source of danger to cities situated on its banks, for it may happen that the sewage will float for miles without being thoroughly diluted. On our Great Lakes the sewage of the cities on its shores often floats on the surface for great distances, being driven back and forth by the winds, and frequently returns to the cities as a part of their water supply. This has repeatedly been the case at Chicago, Cleveland and other places, therefore we must conclude that dilution is practicable only for cities located on the sea, and that most of our interior towns must solve the problem scientifically and the proper disposal of sewage is today a sanitary problem of immense importance.

IRRIGATION AND SEWAGE FARMING.

This was one of the first methods to be used on a large scale. Theoretically it is based on the supposed ability of plant life to indefinitely absorb the organic matter in sewage, which incidentally acts as a fertilizer. It is now known that plant life cannot decompose organic matter without bacteria and that ordinary sewage has little value as a manure, consequently this method is little used, except where the cheapness and suitability of the soil renders it possible.

A COMMENDABLE EXAMPLE FOR OUR UNION FRIENDS.

For the first time in Chicago, it is said, an instance was recorded this month where a labor union fined a member for assaulting a non-union worker. The case was that of David Bergquist, 7887 Winneconna avenue, a member of the Carriage and Wagon Workers' Union, charged with assaulting Harry T. Stevens, a non-union fellow employe at the factory of the H. McFarlane Company, 100 West Harrison street. The full part played in the matter by the labor organization was as follows:

Bergquist was produced in court by the union.

His union associates gave the only evidence against him.

He was fined $20 by the labor organization for the alleged assault.

Bergquist and Stevens were leaving the factory on the evening of April 2 when the former turned to his companion and demanded that he join the union. Stevens refused, a quarrel followed, and the non-union man was "slugged."

A warrant for Bergquist was secured the next day, but he could not be found. Attorneys for the Citizens' Alliance, which was prosecuting the case, went to the headquarters of the union and asked for the man.

"We will produce him in court to give bonds tomorrow," said Secretary Newman.

As the only witnesses to the fight were the union employes of the factory, they were subpœnaed. Four men testified that Bergquist had committed an unwarranted assault upon Stevens.

"I am told that your union fined you $20 for the offense," said Col. James H. Davidson, attorney for the prosecution.

"Yes, I was fined, and I paid it," replied Bergquist.

New Jersey Master Plumbers in Convention at Orange.

Paris and Berlin have sandy wastes near them which need water and manure and in these cities the method has been and is still used with more or less success. Sandy loam soils will dispose of from five to fifteen thousand gallons of sewage per acre daily when properly underdrained at a depth of five feet. In sewage farming the plants take up a large part of the moisture, the rest being removed by evaporation and drainage. Raw sewage applied directly to plant life either injures or kills it, and great care must be exercised in its application.

CHEMICAL PRECIPITATION.

As has been stated the organic matter is partly in solution and partly in suspension. When sewage is allowed to stand for a time a part of the suspended matter settles as a deposit or sediment, though this is of little use as a means of purification. Chemical precipitation aids this natural sedimentation, the idea being to add to the sewage cheap chemicals, like lime or iron sulphate, which, under favorable conditions, entangles or forms with some of the constituents of the suspended matter insoluble substances which subside and leave the sewage clear. The treatment commonly adopted consists in

slowly passing the crude sewage, previously mixed with the chemicals, continuously through a series of open tanks, during the passage of which the suspended substances are deposited, giving a clear effluent.

The method demands fresh sewage, thorough mixing with the chemicals and large tankage room. At best it removes only half of the total organic matter. It gives a clear effluent but this is unfit to turn into the streams. because it is still capable of putrefaction, unless the flow is great as compared with the volume of the sewage. The product generally requires additional treatment.

The process is useful in preparing manufacturing sewage for treatment by other methods; as, for example, when the sewage contains germicidal material. The cost is large—about fifty cents per capita. The septic tank does the same work more effectively and is less costly. The sludge resulting from chemical precipitation is abundant and is difficult to handle. It possesses some fertilizing value, but the farmers are slow to use it. It is generally disposed of by fire or by dumping it on unused land.

INTERMITTENT FILTRATION.

This consists in conducting the raw sewage intermittently upon prepared, porous areas of sand. The doses are applied for about six hours out of twenty-four. In the interval of rest the sewage thus treated is acted upon by the bacteria present, which live upon the organic matter and effect its decomposition, forming harmless mineral substances.

The application is intermittent in order that the becteria may have time to change all the organic matter collected in the beds from the last dose of sewage. The conditions favor the growth of the variety of bacteria which demands light and air for their sustenance; that is, the aerobic bacteria. It it the function of the aerobic bacteria to oxidize the soluble putrescible substances into mineral matter of a harmless kind.

This method has been amply developed and its efficiency determined by the investigations of the Massachusetts State Board of Health, whose researches on the purification of sewage and water have been carried on for the last fifteen years, so that to-day we can assert that intermittent sand filtration stands as our most effective method of purifying sewage, though it is not the most rapid.

The sand beds may be of any suitable area and are from four to five feet in depth. These are filled with sharp, moderately coarse sand. As has been said this method has been perfected in theory and practice in Massachusetts where sand is available and many cities, like Brockton, have used this process with great success. The Brockton beds are twenty-four in number, each bed being one acre in area. The beds are separated from one another by embankments of dirt four or five feet high and are carefully leveled and underdrained by farm tile placed about twenty feet apart. All drains lead to a common drain, through which the effluent passes to the place of discharge.

The fresh sewage passes from the sewer into a building called the "weir-house," where it is passed through screens to remove the floating matter, the screens being placed over settling tanks, where the sludge and heavy sediment settles. Then it is conducted for six hours upon one bed, then on to another for six hours, and so on, so that the first has plenty of time to rest before receiving a second dose.

The sludge formed in the settling tanks is at intervals discharged upon a small filter bed called the sludge bed, where the excess of moisture is removed. It is dried, scraped up and dumped on unused land or ploughed into the soil. At Brockton the sewage is disposed of at the rate of about forty thousand gallons per acre daily, though ordinary sewage is treated at the rate of sixty thousand gallons and in some instances at a higher rate.

The sewage as it uniformly spreads over the bed sinks into the sand, carrying air with it and is followed by air where it is acted upon by aerobic bacteria and is oxidized or nitrified into mineral substances. The particles of sand thus become surrounded with a layer of liquid sewage with relatively large air spaces, which produce the condition favorable for a rapid increase of the bacteria, which destroy all but a fraction of one per cent of the total organic matter and when this occurs the bacteria soon die for lack of food, so that the effluent contains little organic matter and few bacteria.

The beds require comparatively little attention, being scraped about three times a season and the top layer of sand being occasionally loosened by raking. The odor is slight and rarely offensive.

This method produces the best results and is well adapted for such cities as have cheap sand and land, but where these are costly other methods have been proposed and one of the most popular just now is the septic tank method.

THE SEPTIC TANK METHOD.

The septic tank treatment is largely valuable as an adjunct to the sand filtration process. The tanks are large open or closed cement chambers of

As the defendant had been already punished once, Justice Martin merely put him under peace bonds of $500 for one year.

Labor violence was also condemned in a resolution passed by the Packing Trades Council, the central body of the stockyards unions. Officers of the Meat Cutters and Butcher Workmen declared that the measure expressed their views and said they believed unions could conduct their affairs and prosper without employing "slugging" methods.

"Organized labor has been publicly criticized," the resolution said, "because some unions in time of difficulty with employers have been reported as resorting to violence. The American labor movement can best protect the interests of the workers by advocating and insisting upon a strict observance of the law. Therefore, the Packing Trades Council of Chicago and vicinity hereby deprecates any methods of violence by any member of a labor organization."

FORTUNE'S WHEEL.

O! Fortune's wheel turns best for him—
  If we but knew it—
Who always puts, with all his vim,
  His shoulder to it.

KEEP ON KEEPIN' ON.

If the day looks kinder gloomy
  An' your chances kinder slim,
If the situation's puzzlin'
  An' the prospects awful grim,
An' perplexities keep pressin'
  Till all hope is nearly gone,
Jus' bristle up and grit your teeth,
  An' keep on keepin' on.

Fumin' never wins a fight,
  An' frettin' never pays;
There ain't no good in broodin' in
  These pessimistic ways;
Smile jus' kinder cheerfully
  When hope is nearly gone,
An' bristle up and grit your teeth,
  An' keep on keepin' on.

There ain't no use in growlin'
  An' grumblin' all the time,
When music's ringin' everywhere,
  An' everything's a rhyme;
Jus' keep on smilin' cheerfully,
  If hope is nearly gone,
An' bristle up and grit your teeth,
  An' keep on keepin' on.

—New Orleans Times-Democrat.

WATER CURTAIN, A PERFECT THEATER PROTECTION.

Solid sheets of water rising from the footlights and stretching across the proscenium arch, forming a wall of water completely separating the stage from the auditorium—this may be the fire curtain of the future. The "water curtain," which will doubtless be installed in all first class play houses of the future, is the invention of John W. Regan, late chief of the Boston fire department, and is called the "Regan."

A pipe leads from a main in the street underneath the stage to the center of the proscenium arch. The nozzle is screwed on to it flush with the top of the stage floor. If there is not pressure enough from the street, which should be at least 60 pounds, it must be supplied from a tank from above.

This will give three sheets of water 150 feet wide and 60 feet high. Of course there is the double action of the water going up and coming down. One of these curtains will protect the Boston theater stage, which is the largest stage in the world. The water curtain will also lift the smoke so that the auditorium will be clear and the audience can walk right out. Such

varying area and depth, depending upon circumstances. Through these the crude sewage is so slowly passed that the journey requires about twenty-four hours. During this passage the anerobic bacteria which are present in the sewage rapidly increase and act upon the liquid and solid parts of the sewage, producing unorganized ferments, which break up (by a kind of hydrolysis) the complex proteids and other decomposable organic matter into gases and simpler liquid forms. The gases commonly evolved include the oxides of carbon, some sulphur gases and so much marsh gas that attempts have been made to utilize it for lighting.

In this tank the air is practically excluded so that the aerobic bacteria, if present, are inactive and in this stage of the treatment are not concerned in the decomposition of the sewage. The inorganic portion of the sewage, like grit or sand, and the nonputrescible organic matter, such as wood fiber, settle to the bottom of the chamber as a sludge. This is a black, mud-like deposit, which is occasionally removed.

In the tank all the decomposable sewage is disintegrated, much gas being evolved and the semipurified liquid portion passes to the sand beds for further treatment, where little difficulty is experienced from the clogging of the beds since the coarse materials settle as a sludge and the other portions are liquified. The liquid is dark in color and accumulates upon its surface from time to time a scum, which varies from one to ten inches in thickness. The fermentation is often active, thousands of bubbles rising to the surface, bringing with them bacteria and partially decomposed organic matter. The amount of gas evolved is estimated to be about one gallon in a hundred of the sewage. The odor is apt to be offensive and on this account the beds are sometimes covered and ventilated. This operation, like the chemical precipitation process, removes about one-half the total organic matter. It saves about one-half the area of sand bed space and the sand beds will treat about 300,000 gallons per acre daily of this septic sewage or about five times as much as the sand beds alone. This method is not adapted to acid sewage, for the acids kill the bacteria. It is cheaper than chemical precipitation and on the average more effective.

Plumbing Establishment of S. C. Tallman, President of Rutherford (N. J.) Master Plumbers' Association.

CONTACT BEDS.

This is of English origin and aims to replace sand filtration where the latter is not feasible on account of the cost of land and of sand. It appears to be a fairly good substitute.

The beds are water tight, about one-fourth to one-half acre in area, and are four feet deep, and are filled with coke, broken stone or cinders, from one-fourth to one-half inch in diameter, and are underdrained. The sewage is intermittently and rapidly passed on the beds where, on account of the coarse a curtain might have prevented the Iroquois disaster.

The curtain of water is produced by a peculiarly shaped nozzle attached to a piece of pipe with an elbow extending upward.

DROP A PEBBLE IN THE WATER.

(BY GUS WILLIAMS.)

Drop a pebble in the water, just a splash, and it is gone,
But there's half a hundred ripples circling on and on and on,
Spreading, spreading, from the center, flowing on out to the sea,
And there is no way of telling where the end is going to be.
Drop a pebble in the water, in a minute you forget,
But there's little waves a flowing, and there's ripples circling yet,
And those little waves a flowing to a great big wave have grown,
And you've disturbed a mighty river just by dropping in a stone.

Drop an unkind word, or careless, in a minute it is gone.
But there's half a hundred ripples circling on and on and on,
They keep spreading, spreading, spreading, from the center as they go,
And there is no way to stop them once you've started them to flow.
Drop an unkind word, or careless, in a minute you forget,
But there's little waves a flowing, and there's ripples circling yet,
And perhaps in some sad heart a mighty wave of tears you've stirred,
And disturbed a life that was happy when you dropped that unkind word.

Drop a word of cheer and kindness, just a flash, and it is gone,
But there's half a hundred ripples circling on and on and on,
Bearing hope and joy and comfort on each splashing, dashing wave,
Till you wouldn't believe the volume of the one kind word you gave.
Drop a word of cheer and kindness, in a minute you forget,
But there's gladness still a swelling, and there's joy a circling yet,
And you've rolled a wave of comfort whose sweet music can be heard
Over miles and miles of water just by dropping one kind word.

OVER THE WIRE.

A significant character-revealer is our manner of using that labor-saving and space-annihilating device which we call the telephone. "He always answers as if he had nothing else to do," was said of a busy western railroad man whose courtesy never fails, even in a crushing press of work. A fair sample by way of contrast is the individual who answers your question, however reasonably and politely asked, with a curt monosyllable, slamming the receiver onto the hook before his snarled reply has fairly reached your ear.

What the railroad man has found, and what we ought to strive for, is the golden mean between brusqueness and verbosity—the faculty of using just enough words, clearly and cheerfully spoken, to give the questioner an intelligent and intelligible answer. To talk with one who has acquired this art makes telephoning a pleasure instead of something to be dreaded. Kindness and optimism flash along the wires as readily as electricity, and when we develop wireless telephoning they will find their grateful way through the very air we breathe.—Frank Andrews Fall.

material, the sewage is freely supplied with air, which is needed in order that the bacteria may properly perform their function.

The sewage is permitted to remain in the bed for about two hours and is then rapidly discharged, either into another contact bed, where it is further purified, or into the drainage system. Each bed is idle one day in seven and is given two or three charges a day. During the intervals of rest the bacteria oxidize the organic matter. After some use the filling material becomes covered with a gelatinous growth which is full of bacteria. The greater this growth the greater the efficiency of the bed up to a certain limit. If the growth should fill the air space the oxygen supply would be cut off, the bacteria would die and the action would cease. If crude sewage is used the bed it apt to sludge up and the filling material must after a time be cleaned, so that it is best to subject the sewage to a preliminary treatment. This leaves the sewage partly purified and the beds can then handle the putrescible material with less danger of clogging. This method purifies about one-half million gallons per acre daily, several times more than a sand bed of equal area. It is not adapted to acid sewage and while it requires less area than the sand beds the process needs skilled care. There is difference of opinion among engineers as to its success, though the method is in use at Manchester, England, where it is proposed to treat fifteen million gallons per day. Air has been artificially applied in order to increase bacterial action, but with little success.

The treatment in this process is not complete and the effluent must be well diluted before being discharged into the water courses. The beds deteriorate faster than sand beds and need night care.

CONTINUOUS FILTRATION.

This method is designed to increase the amount of sewage per acre by spraying chemically treated or septic sewage on the beds. The aim being to so arrange the beds and the method of supplying the sewage that air is constantly entangled in it in order that the periods of rest necessary in other bacterial methods are avoided and thus can sufficiently treat large amounts of sewage, so that it may safely be introduced into the streams.

The Stoddart filter has met with considerable success. It is said to purify five million gallons of treated sewage per acre daily. The material, about two inches in diameter, is placed upon a concrete floor with a slight slope in all directions so as not to hold water. The drains surround the bed. As the success of the method depends upon a continuous supply of air the distribution of the sewage is an essential feature. This is applied to the bed in a fine spray or rain by the means of galvanized troughs, much like our eaves troughs, with diamond shaped notches cut at intervals in the edge of the gutters, and have on their under side nail points, which break up the flow into drops. Great care is taken to keep the gutters on a level, to insure an equality of distribution and to keep out material which might clog the troughs. Freezing weather would doubtless stop the action of such a bed.

The Whittaker-Bryant filter uses two-inch coke, which is placed in a chamber about fifty feet in diameter and ten feet deep. The floor is of cement and has a central air shaft. The walls and shaft are raised so as to insure circulation at the bottom, where the drain tiles are placed. It is said to treat one million gallons per acre daily. The sewage is automatically sprinkled over the bed and in order to keep the temperature at the point of the greatest bacterial activity steam is forced into the sewage before being sprayed. The bed is supposed to be self-aerating because it is thought that the warm air in the filter will rise through the coke and thus draw fresh air from below.

The Salford bed is about five hundred feet square and ten feet deep and is filled with cinders varying from one-fourth to one-half inch in diameter. The floor has a slope of about one inch in twenty feet and is covered with tiles raised so as to secure ventilation beneath.

The sewage is delivered to the bed through two thirty-inch mains, one of which is connected with seven and the other with eight horizontal pipes which run the length of the bed, under which the drain tiles are placed. Valves control the flow.

The horizontal pipes are supplied with vertical pipes ten feet apart and ten feet high, which are supplied at the top with other horizontal pipes, also ten feet apart, projecting over the surface of the bed. Every five feet these pipes are provided with vertical jets set at an angle, through which the sewage is projected several feet into the air and falls upon the bed as a fine rain, through which it passes on the way to the underdrains and thence through the main to the place of discharge.

The claim is made that this bed will treat from five to eight million gallons of sewage per acre daily. The method is costly and its usefulness not yet thoroughly demonstrated.

A GOOD FIGHTER IN A GOOD CAUSE.

"Chicago certainly does not deserve the reputation of being a progressive town when it comes to public comfort stations," said D. L. Hanson, country sales manager for James B. Clow & Sons. "Anyone who has traveled at all knows that European cities are well equipped in this respect while in our own country New York has done a wonderful work in providing herself with these most necessary conveniences while San Francisco two years ago built her first underground public comfort station.

"In Chicago there is nothing of the sort, except in the outlying parks and even those are closed after 10:30 at night. The subject is well worth the consideration of our authorities, but probably first of all a public sentiment must be created. In Chicago, like most other cities, the administration follows while the public leads.

"In New York public comfort stations can be found in the Battery, in City Hall Park, in Madison Square, in Greeley Square and in other various little breathing spots as well as in the crowded east and west side tenement districts. The public comfort station in Mulberry Bend Park, within a stone's throw of the Bowery has an attendance of over 70,000 visitors a day, while the one in the Battery probably has double that number of admissions. The most modern underground station on Manhattan Island is the one in Greeley Square and is said to be the largest of its kind in the world. Brooklyn is also well equipped, having five in the business districts.

"The experience of San Francisco is probably analogous to that which Chicago will have. The demands of the public, although voiced at times very strongly, received no satisfaction at the hands of the authorities. Finally the Merchants' Association, a body of men, to whom certainly all honor is due, conceived the idea of erecting one at their own expense. After much debate and negotiation with the park authorities, it was found advisable to make an underground station in a little square in one of the principal business districts. About twelve months ago this was opened to the public, the Merchants' Association having spent something like $8,000 in its construction and equipment. The argument advanced by the purists of the Golden Gate City that 'No self respecting woman would ever enter anything of the sort' was refuted within twenty-four hours of the opening of the station, it being patronized by the very best people. The necessity for more conveniences is now being seriously agitated.

"Chicago, however, has done nothing, having gone to the extent through one of her recent city officials of advising an eastern municipality, that 'such a thing as a public-comfort station is not necessary in Chicago. We have saloons, restaurants and depots, who look after that!'"

"Has this movement received the approval of the authorities in the various cities where it has made headway?" Mr. Hanson was asked.

"I can best answer that by quoting President Roosevelt's letter to the chief of police of New York City, when he was police commissioner. 'I believe it absolutely essential to the discipline of the police force that public comfort stations be established so that no policeman can offer an excuse for entering a saloon. Now he has an excuse and one that cannot be refuted.' Col. Green, who had charge of the metropolitan police during Mayor Low's administration, more than once paid tribute to the public comfort station, as a means of increasing the efficiency of the men under his control.

"Both New York and San Francisco have found that the underground station is the most satisfactory in that it requires very

MacDonald to the Rescue.

Detroit Master Plumber Resents Unmerited Abuse by the Public Press of the famous Riverside Club.

THERE has been in the public press of this city during the past few months, and no doubt copied extensively by the press throughout the country, a great many articles reflecting on the master plumbers of this city, and the plumbing business in general, in which they are held up to view as robbers, devoid of all human instincts, not fit to associate with their fellow beings, and should be ostracized, etc.

Now, if all these charges were true, they are not good citizens, but a menace to society, should be banished from such, and their hopes of ever reaching heaven are slim indeed.

These are some of the charges, and so far I have not seen anything to contradict them. Unless the public should be inclined to accept these charges as gospel truth, I will endeavor to refute them and place the plumber where he belongs, at least looking at it from a practical plumber's standpoint.

It is known to the well-informed that plumbing is one of the ancient crafts. We learn that the ancient Romans were very cleanly in their habits, bathing several times a day; they had their public baths, which were very luxurious, with tiled floors and walls, also solid bronze and marble bath tubs, with water conveyed to their frigidarium and tepidarium baths and fountains through lead pipes; and our own Professor Griffith, Director of the Museum of Art, informs us that he has seen sections of these pipes in the ruins of Pompeii, evidently made of heavy sheet lead, formed on a mandrel, with longitudinal seams soldered, but not being particularly interested in plumbing, he did not know whether they used wiped points to unite the different sections, but we must presume they did. The faucets also were not unlike those in use in Italy in the present time, showing even at that early period that the plumber must have been a skillful worker in metals, and as at the present time, indispensable.

But now let us compare the modern with the ancient plumber. The knowledge of the latter consisted in making and joining pipes together, setting tubs and installing faucets. As there was no sewerage, there was of course no danger from sewer gas, no system of ventilation, no setting of traps. He knew nothing of siphonage, attrition, etc. But the modern plumber, if he has thoroughly mastered the practical and technical part of his business, has not only to be a plumber, but sanitary engineer and physician as well, for he is often called in to diagnose cases of sickness where physicians have been baffled, and has diagnosed the case of such sickness as being due to the presence of sewer gas, traceable to imperfect plumbing, which being remedied, the patients speedily recovered.

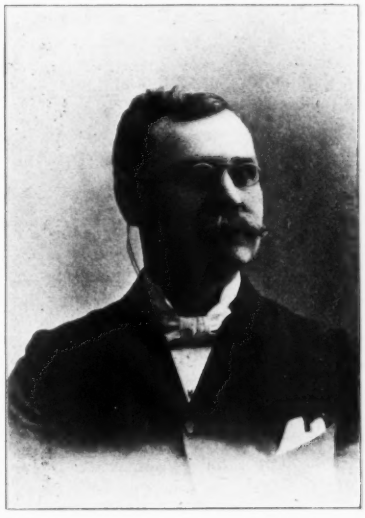
But, of course, we will have to admit that all those engaged in the plumbing business do not come under this category. For instance, there are men in this business today that should never be in it. They have graduated from tinsmiths, steam-fitters and other trades, and I believe in one instance from a day laborer that excavated for water pipes and sewers. It was the writer's privilege, while secretary of the first board of examiners, appointed by the late Mayor Pingree and the board of health, to correct the examination papers of all the master plumber in this city, and while the questions were as simple as possible, appertaining to every-day plumbing as we were all supposed to understand it, even at that time, and they were only required to pass 60 per cent, still some of those calling themselves plumbers could not pass 20 per cent.

Now as to the Riverside Club, of which so much has been said. Of course, as is now well known to the reading public, it was composed of all the jobbers in plumbers' supplies in this city, and while I don't desire to take up the cudgel in defense of anything they might have done, that did not seem, in the eyes of the public, right, they can do that for themselves if they so desire, but only in so far as their connection with the Plumbers' Association is concerned. The members of these several firms are reputable business men and have large sums of money invested in their business and pay heavy taxes. It was therefore only natural that they should desire the plumbers of this city to buy goods of them in preference to buying outside. To that effect an agreement was entered into between them and the Plumbers' Association (not, as was supposed, for the purpose of robbing the public, but to keep as much of the business, and therefore money, in the city as possible) to meet once a month and thereby draw the plumbers and jobbers closer together for mutual benefit.

little expense for exterior walls, leaving so much more money for the furnishings. It also is less conspicuous as all that is seen from the street is the area railing. In the station in Greeley square there are seventeen closets in the men's room, 32 urinals and 10 wash basins, while in the women's portion there are 8 closets and 5 basins. Admittance is absolutely free, but a small charge is made for the use of towels and soap, two cents, I believe, is the amount."

"What point would you suggest as the best place to put the first public comfort station in Chicago?" Mr. Hanson was asked.

"I should construct a series of public comfort stations in Grant Park, making them underground and having the entrances as near to Michigan Avenue as possible. I believe the time has come when we, as citizens, should realize that by our negligence in this matter, we entail great suffering and inconvenience and put our young people in danger of the temptations of the saloon, these being the only places where one can find relief ready at hand. In fact this was one of the strongest arguments presented by those who opposed the midnight closing ordinance—that night workers in the down town district had no other places to which they might go for relief on their way to or from work. And the argument is a hard one to answer."



HUGH MAC DONALD
Doughty Champion of the Much Abused Plumber.

Mr. Hanson has spoken before several improvement societies on this important topic and says he is enlisted for the war and stands ready to "preach the doctrine" wherever and whenever he gets an opportunity to do so.

A Smart Boy.

A boy, twelve years old, once conquered a smart and shrewd lawyer fighting for a bad case. Walter was the important witness, and one of the lawyers, after cross-questioning him severely, said—"Your father has been talking to you, and telling you how to testify, hasn't he?" "Yes," said the boy. "Now," said the lawyer, "just tell us how your father told you to testify." "Well," said the boy, modestly, "father told me that the lawyers would try and tangle me, but if I would just be careful and tell the truth, I could tell the same thing every time." The lawyer didn't try to tangle up that boy any more.

Now if there was anything illegal in this, I don't believe men of such high reputation and standing among their business associates would have gone into it, and I am very sure the master plumbers would have had nothing to do with it. Still it does seem as if anything a plumber does must be wrong. They have always had the reputation for charging big prices, and I actually believe if they were to do their work for nothing they would be required to give a bonus for being allowed to do it. It is well known that everything that enters into plumbing is expensive, even in its raw state. For instance, iron, lead, copper, tin and earthenware enter mostly into the goods they put in. Of course, if the same amount of money that was required to install the plumbing in a residence was put into lumber or brick, it would make a big pile; but it does not show in plumbing, as so much of the work is hidden in the partitions and between floors and ceilings, and only a few fixtures are noticed throughout the house. Then again all our work is under heavy pressure, unlike any other business. The least defect will cause serious damage to health and property. It has to be very carefully put in, which, of course, takes time, causing customers to imagine the plumber is taking too much time to do his work. Of course, a carpenter would make more of a showing, but if his work does not just fit, a little putty will remedy it, there being no pressure behind it to force it out and expose imperfect work. The painter then comes along, runs his brush over it, and there you are. Everything slick and apparently perfect.

Now if the plumbers received the prices and made the profits they are credited with getting, they would only require to be in business a few years and then retire, but there are some men who have been in this city forty years and have not been able to retire yet, while men in manufacturing and other lines of business do. Then why not a master plumber, who works, I certainly believe, harder than any other business man, but gets nothing but kicks and cuffs, and is called a robber.

Do the public ever stop to consider the trials that a plumber has to undergo? We will take the past winter as a sample. During zero weather the plumber will get down to his place of business earlier than usual. The phone will ring, a voice will inquire, "Is this Mr. Plumber's place of business? Well, this is Mr. Smith. The water pipes in the bath room froze and burst last night, and are ruining the ceiling and carpets. Must have a plumber at once."

In five minutes the phone rings again. "This is Mr. Brown. Girl forgot to leave the fire in kitchen range; water front frozen and burst; floor flooded. Can't get any breakfast until repairs are made. Want a plumber at once."

In about ten minutes phone ring again. "This is the Jones Renting Agency. Have just rented a house that has been vacant all winter. Want you to go up at once (they all have an idea you have a lot of hooks in your shop and a plumber hanging on each), and turn on the water and fix the plumbing for a new tenant." You inquire if the water had been turned off, pipes and tanks emptied and plumbing put in shape for cold weather. You are informed, "No, but don't think there is much to do." You know there will be. You take your plumber up, find all the water pipes, fixtures and traps frozen and broken, tanks solid with ice, new bowls to put in, etc. Everything has to be thawed out and put in shape. On the first of the next month after the weather has moderated, you send in your bill, and are informed that the owner refuses to pay such an exorbitant price. He was sure the plumber wasn't there over one hour. Wants to know if you haven't made a mistake, and can we not cut the bill in two.

Oh, yes, a plumber's life is a delightful one. You ask what pleasure has he? None. He can't go south in winter, nor to the seashore in summer like other business men. He may possibly go to a ball game a few times during the season, and that comprises about all his pleasure.

Now, if in this article I have shown that the plumber is human and not altogether as bad as he is made to appear, I have accomplished all I set out to do.

Detroit, Mich., April 18, 1904. HUGH MACDONALD.

"A Fall Order."

COMMON ADVERTISING TERMS ILLUSTRATED.

J. K. A. SAYS:

Cheer up! The worst is yet to come.

* * *

Edward Atkinson says the war and aggressive occupation of the Philippine Islands costs every man, woman and child in this country two dollars per year to maintain. I would like a receipted bill for my share.

* * *

But war is expensive, whether between nations or individuals, and the business war is as deadly as the other kind, in a way. A good example of the results of business warfare is shown in the plumbers' woodwork trade. Mr. Carey, of New York, an honest man and a credit to the business, goes out of the business this month. It is reported that another New York concern, which was burned out last winter, is making no effort to get under way again. The auctioneer's hammer has pounded merrily over the plant of the American Manufacturing Company, of Middleport, Ohio, and the receivers of the McShanes are endeavoring to dispose of their woodworking plant. This shows a bad state of affairs, and is comparable to some other lines in the plumbing and heating trade. Grant said: "Let us have peace." 'Tis a good saying and worthy of all acceptation.

* * *

The plumbers' woodwork people also have to face a scarcity of northern hardwoods. It is said the Michigan and Wisconsin markets were never so bare as they are this spring. Dry lumber has practically vanished and green stock of this year's cutting has largely been sold outright, or is under contract for delivery when ready for shipment. These facts look like a stiffer market for this line of stuff.

* * *

I was talking with one of our Chicago jobbers recently regarding his lease and he remarked that last year he didn't have room enough; this year he has too much. This shows pretty well the barometric rise and fall of business conditions. This, too, with rentals advancing all over Chicago—a condition which should give an impetus to the building business.

* * *

The location of a large manufacturing plant in an obscure country village in Illinois shows how the judgment of business men changes in reference to desirable locations for manufacturing institutions. The old economists used to argue that large cities offered greater inducements to manufacturers because cities offered a larger supply of labor—that labor was in greater competition with itself in larger communities than in small. This theory has been upset by the unionization of labor by which the competition of labor has been stifled. Now, country communities are preferred, because of the greater stability of labor. Municipal taxes are also (in Chicago, certainly, and in other communities, probably) very high, and costs of doing business greater than is the case in small villages. These changes show that economic theories are not yet fixed, but are still in a state of flux.

* * *

It may prove comforting to some of us who are fearful for the future of our country, and pessimistic as to the advancement of the race, to know that the discouraging conditions which now seem such dangerous enemies to society, were not unknown to previous generations. Writing in 1810, Rev. Ellery Channing, a keen analyst of human affairs, said: "We live in times that have no parallel in past ages; in times when the human character has almost assumed a new form; in times of

Talks with the Young Mechanics.

By Charles W. Naylor, Instructor in Chicago Y. M. C. A. College.

(CONTINUED)

Many are the departments of science in which study is going on, principal among them being astronomy, botany, biology, chemistry and mechanics, under which latter head comes hydraulics, hydrostatics, pneumatics, electricity, magnetism, light, sound, heat, steam and the steam engine.

The great teachers come in for a share of our devout attention and research. Foremost among them Joule and Rankine, the former a Frenchman, the latter an Englishman. But while admiring them we must not forget for even a moment that other countries have produced master minds, even if their names are not familiar to our tongues. The science of heat and the steam engine has not been the result of efforts of Englishmen alone, but represents the combined efforts of Germans, Italians, Austrians, Frenchmen, Swiss, Swedish, Norwegians, Russians—in fact, some of the most important achievements are not the work of Englishmen at all, but in very many cases we are indebted to Frenchmen and Germans for the greatest of our discoveries.

We are therefore justly entitled to conclude that the science of heat or thermo-dynamics is not of one country or people, but like all true sciences is of the whole civilized world.

We know no political boundaries among engineers and it is too bad that we do not all read, write and speak one tongue, so that there could be a freer exchange of ideas.

I wish in the first place to assure my young hearers that physics can be studied conveniently, pleasantly and profitably at one's pleasure. It is easy—not dragging or confining, and does not call for persistent devotion, in so much that it really becomes a relaxation while at the same time it covers an immense territory.

In fact, most teachers claim not half enough time is allowed for it in the curriculum of the average school. I will quote from the introduction to Nichols, Smith and Turtons' experimental physics for high schools:

"In nearly all schools the time allotted to the subject of physics is altogether too short—six to ten hours daily for a whole school year of ten months should by right be devoted to this subject, divided equally between the class book and the laboratory or practice shop."

Apparatus for experimental work need not necessarily be expensive; many of the pieces being home-made, if one chooses. The text book should be consulted frequently and access to a good library will be of great help, especially as we become more proficient in the science. When an experiment has been once made it should be conscientiously repeated as often as necessary to fix the principle back of it firmly in the mind and here our old friends, the pencil and paper, come into play. It is best to make copious notes of the several processes and results, making these replete and explicit. Your note book will be to you the resume of all work done. Calculations will have to be made commensurate with the mathematical knowledge of the student, and if graphic or diagrammatic results can be tabulated, so much the better. Cross-section paper—that is, paper ruled in squares—is the proper material to use for this latter work.

While I may have led you to think that only the simplest and most meager of apparatus is needed in the work, it is equally true that it is much better to have some tools or apparatus to work with—for instance, a rule, a pair of calipers, also a pair of dividers, a scale or two, a balance scale and weights, some thermometers, etc., etc. The balance is useful in getting a good idea of the specific gravity of different materials, for we know in a general way, even if we are not physicists, that all substances do not have the same weight. For instance, if we cut out equal sized pieces of lead, iron, stone, wood, cork, etc., and weigh them accurately, we get the ratio that exists between their several weights; and if we use water in equal volume at a standard temperature for comparison, we get at once the specific gravity of the substances named. Lead will be the heaviest, cork the lightest, the latter being lighter than the water which we took for a standard. Most woods are also lighter in weight than water.

If water, the standard, is called 1, then lead will be represented by 10, or some other number, iron by 8 or a number near that, showing that iron is lighter than lead. Liquids can also be compared with water as brine, sulphuric acid, oil, kerosene, alcohol, etc. In fact all solids and liquids are compared to water as a standard. The water has to be pure, distilled, and taken at a standard temperature, about 62 degrees Fahrenheit, because the weight of water varies with its temperature, being heaviest at 39 degrees temperature and decreasing in weight as its temperature is increased up to the boiling point, which is 212 degrees Fahrenheit at the sea level.

peculiar calamity, of thick darkness, and almost of despair. * * * The danger is so vast, so awful, so obvious, that the blindness, the indifference which prevail, argue infatuation, and give room for apprehension that nothing can rouse us to those efforts by which alone the danger can be averted."

* * *

The threatening calamities which seem peculiar to our own times have had counterparts, or, at least, dangers seemingly as real and terrifying to generations long since passed away. We can take hope, therefore, and know that even in years that seem fraught with danger, human society is making itself better, and the problem of life is being gradually solved.

* * *

Thomas Kane, a well-known Chicago manufacturer, has been comparing our present period of social unrest with previous conditions in our country, and some of the facts he brings to light show that some progress has really been made. In 1819, of 9,600 persons employed in certain industries in Philadelphia, 7,500 were discharged. Pauperism and crime increased in about equal ratio and the whole country was a seething mass of discontent. The average daily wage for a day of fourteen hours was 25 to 37 cents a day in winter and 50 to 75 cents in summer. In 1829 trade unionism was strong, strikes were common and bitter, even to the necessity of calling out soldiery, and the boycott and sympathetic strike were the ordinary weapons of trades unions. We are able to study the conditions prevailing then with a dispassionate mind, and we see that some of the results gained have been a shorter working day, better work places and regulation of child labor.

* * *

Mr. Kane considers the rapidly increasing use of machinery as the most important element in the problems of labor. He points out that the United States, from being fourth among manufacturing nations thirty-one years ago, now stands first, and says this was accomplished mostly by machinery. In the ten years between 1890 and 1900 the horse power in the United States engaged in manufacturing increased nearly 90 per cent—from 5,954,655 to 11,300,081. One horse power is equivalent to ten men, so that we have machinery adding the work of 53,454,000 men to our laboring force in ten years—men of steel and iron, who never tire, never get drunk, are always on hand Monday morning, never get lazy, never shirk and never strike for higher wages.

* * *

In spite of this enormous addition of working force our laborers are no more unemployed than ever. The introduction of the bitterly fought sewing machine has enormously increased the wage-earning possibilities of women; the dreaded McCormick reaper has proven a blessing to the laborer by keeping food cheap; the linotype was thought to be the destroyer of printers' wages, but more men are engaged in printing than ever; the use of molding machinery in making bath-tubs is being bitterly fought today, but history will repeat itself and its use will prove a blessing to labor instead of a curse.

* * *

We are all laboring men, in one capacity or another, and the problems of the moulders are the problems, in the last analysis, of the accountant. I am satisfied that the restriction of a man's labor, which he is willing to give for a day's wage, is not the best way to advance the wage received. I know the theory most unions proceed upon is to "make work" by reducing the number of hours or the number of men. I fully

Gases are compared in weight with either pure air at a standard temperature or with hydrogen gas, which is the lightest of all commercial substances. Air is heavier than hydrogen, carbonic acid gas is heavier than air, which fact has an important influence upon the subject of ventilation of buildings and mines or wells. Great care must be exercised in experimenting with gases in this regard to keep the temperatures standard, for heat has a very marked influence upon the weight of gases, more so than in the case of liquids and solids. You will be surprised to find how much of a figure the question of heat cuts in all physical problems.

You will more than once ask yourself, What is this heat that I meet with so often and for which I have to make so many allowances and corrections? And you may well ask that question. In fact, it would be advisable to take up the study of heat directly and learn how it affects all substances in preference to taking up the substances one after the other and wait to see what effect heat has on each of them. Not many of us can properly define heat. That is, define it clearly and correctly. We all may think we knew what heat is, but whether we can state or write a good passable definition of what heat is, is another thing. It is a substance? The ancients thought it was, and some of us who would resent being classed with the ancients even now don't know any better—at least not very much better.

Is heat a substance? Can it be divided? Can it be seen? Can it be measured? Can it be weighed? Can it be taken from one place and put in another? Can it be measured in vessels or on the balances? Can it be felt? Can it be tasted or heard or smelled? Is it distinguishable by any or all of the five human senses, such as seeing, hearing, smelling, touching, tasting? Apparently it can, but really it cannot. Is it, then, a substance? Now, in undertaking to answer this question be sure that you distinguish between heat and some of its effects. If you touch a body that is hot and get burned, is it heat you see or feel, or is it an effect of heat? Could you fill a vessel with heat, as you would with water or air and pour it out? Can you fill a room or apartment with heat and lock it up to remain there, or will it leak out? If so, does it come out through the cracks in the room?

If you believe in this comparison, suppose you fill a closed, non-porous cylinder or jar full of heat, which can not leak out. Will it stay there, or perhaps it is light and rises out of the open top. Can you put your hand down in the jar and displace the heat? Now these questions are not strictly fair; they are not scientific or correct. We can not consider heat as a material substance, and must look for some other explanation of it. I say, we must, but don't take my word for it. If you have doubts on that score you should investigate further and prove or disprove that heat is a substance and must not leave the subject until you are thoroughly satisfied in every respect that heat is or is not a material substance. That is what you are studying physics for. The question is of too transcendent importance to be slighted or left unsettled, so stick to it until you are perfectly satisfied one way or the other. And do not stop after apparently satisfying your own mind, but make your opinion agree with the majority of scientists, or you are booked for trouble of a serious kind at every subsequent step of your way.

While I urge upon you to get in harmony with your fellow students, do not do that because I say so, for if you can stick to your line of reasoning and disprove the opinions of others you will become at once a great man, a very great man, a genius and the world will hail you with glad acclaim. There is not a scientific man alive today who wouldn't be tickled to death to see any of our accepted theories knocked into a cocked hat. Just establish beyond cavil some new idea or knock out an old one and you will receive homage that may turn your head. So go on and turn present things topsy turvy. It won't hurt you or the world. It will do us all good. Do you think you can do so? Possibly you do at this stage of the game, but the more you study and experiment and think and calculate the more impressed will you become that science is based upon cold, hard facts and facts that we can not get around or evade.

Approach them in a tolerant and intelligent spirit. Do not make the mistake in thinking you are smarter than the combined wisdom of the world. Look up the things that we are pretty sure can't be improved upon and let them severely alone. Don't try and make a dollar do the work of two dollars. It will be love's labor lost. Don't tackle the perpetual motion problem unless you have carefully figured out how you can disprove existing ideas upon the subject. Live and let live. Keep your hair cut reasonably short, and when you get older don't let your eyebrows grow down. You will command greater respect from the world and will feel more at harmony with your fellow man. All of which conduces to that peace of mind which is absolutely essential to keeping your intellectual facilities clear and bright. Remember you are but a beginner and should walk with careful steps, especially when you venture into strange places.

believe the surer way to increase wages is to increase efficiency. If a manufacturer runs a machine and gets but 25 per cent of its efficiency he is a bad manager. If a man in his employment gives him 25 per cent of his efficiency he is a bad workman, blind to the interests of his employer as well as of himself.

* * *

We pat ourselves on our backs when the arithmeticians at Washington tell us that our foreign trade in one period greatly exceeded the last corresponding period, and we say we are getting to be a great exporting nation. In the plumbing and heating line I don't believe any firm in this country which has given it a fair trial will truthfully be able to say that they have got more than glory out of it. It's nice to say in your trade literature that your goods are in the palace of a king, but, shucks, there's no money in it. I'll give any manufacturer in our line, who has made money selling his goods abroad, free space to get up and say so, and it won't cost him a cent either.

* * *

The traveling men are not to be envied for their easy berths. From Monday morning until Saturday night they are endeavoring to steer goods into the channels of trade for which they are the pilots. The oldest traveler for plumbing supplies in Texas is probably George Dreiling, who lives in Dallas, but who has traveled in many states during the twenty years he has been on the road. It was in 1884 Mr. Dreiling first went on the road for the L. M. Rumsey Manufacturing Company, of St. Louis; he represented them two years and then went with the N. O. Nelson Manufacturing Company, of St. Louis, whom he represented ten years. For some years he covered Iowa and Northern Missouri and later added South Dakota to his territory. In 1893 he was sent to Colorado, New Mexico and Arizona, making his headquarters in Denver. After three years in that section he went with the Western Brass Manufacturing Company, of blessed memory, traveling for them from Colorado to the coast. In 1899 he went into the office in St. Louis and took charge of the traveling force, order and sales department, where he stayed until 1901, when he went with his present firm, the Fairbanks Company, of New Orleans, looking principally after the plumbing goods sales. He was first sent into Alabama, parts of Georgia and Florida, where he was quite successful. He has been traveling in Texas for about twenty-two months and has built up a good, substantial trade. Mr. Dreiling is a member of Ascalon Commandery, No. 16, Knights Templars, of St. Louis. His face is known to many of our readers.

* * *

They were talking about the extravagance of a friend.

"He is spending money like water," said one of them. "If he keeps it up he will be ruined. Some of you fellows ought to put a stop to it instead of encouraging him."

"Well, I don't know that he is spending so much," put in another. "I was with him the other night and I spent $105 on him."

"Then he must have spent at least $750," was the ready answer, and the man who had spent the $105 did not see just where the joke came in when the others laughed. J. K. A.

Examiner of Plumbers—"What do you know about laying gas pipe in the street?"

Candidate for Certificate—"I know they hadn't oughter be laid until the street has just been repaved."

Prof. R. Moore, in his hand book of Twenty Thousand Industrial Facts, gives this advice: "Never consider time wasted that is spent in learning rudiments. In acquiring a knowledge of any art or handicraft the greatest difficulty is experienced at the beginning, because our work then possesses little or nothing of interest. Our first lessons in drawing or with tools or in music, for instance, are very simple. Indeed so simple are they that we are disposed to undervalue their importance. The temptation is to skip a few pages and begin a little farther along in the book. But such a course is fatal to success. To learn principles thoroughly is to succeed. Be content to learn one thing at a time, whether it be to push a plane square and true or draw a straight line. Whatever you learn, learn it absolutely, without possible question. This will enable you to advance steadily, step by step, year after year and some day you will wonder why you have been enabled to distance some of the geniuses who once seemed so far in advance of you. Set your heart upon what you have in hand. Valuable knowledge is acquired only by intense devotion. You must give your entire mind to whatever you undertake, otherwise you fail or succeed indifferently, which is no better than failure. Learn, therefore, to estimate properly the value of what is called leisure time. There is too much of this in the world. Do not mistake our meaning. Rest is necessary and play is very well in its time, but young men who wish to do something in life must not expect to play one-third of their time.

"When you resolve to acquire a thorough knowledge of your art, be equally as anxious to know something beyond it. A craftsman ought to be ashamed of himself who knows nothing but the use of his tools."

How many great problems there are to be solved. We must be able to talk around the world instead of the paltry few hundred miles that are now achieved. We must be able to see any distance and recognize faces and things a thousand miles away, for sound and light are but effects of movement or motion among molecules or atoms, and we are bound to succeed in handling and controlling them at long distances as we do now over short spaces. There is no doubt about this. We have got to be able to travel faster and more safely and comfortably. We have got to go through the air.

Coal is getting scarcer and dearer and is taking the life energy out of thousands who toil for it in the bowels of the earth. We must get some substitute for it. Possibly we will find it in the air, and in the hydrogen of the water. Air and water are the two most abundant things in the world, and are so little made use of except for drink and breath. The surface of the earth, the plants and so forth abound in carbon. Thus in air and water and plants we have the four elements that will feed and warm us and give us that with which to slake our thirst. Oxygen, carbon, nitrogen and hydrogen in their various compounds are about all that we need for life. Will some of you, perhaps, solve the problem of how best to make use of them? Can you discover a way to avail ourselves of the direct use of hydrogen and oxygen with their high temperatures in our engines and do away with the almost universal use of poor old steam which, while it is and has been a good friend of man, still has an efficiency of less than 10 per cent. It is one of the very remarkable things of modern civilization that engineering, the most important of the arts, has not been able to find a medium of power utilization that is more efficient than the steam engine.

(To be concluded.)

"Something on a New Principle."

COMMON ADVERTISING TERMS ILLUSTRATED.

ASSOCIATION NEWS

WATER WORKS MEN TO MEET AT ST. LOUIS.

The second convention notice of the annual meeting of the American Water Works Association is being sent out by Secretary J. M. Diven, of Elmira, N. Y., the president having called the convention for June 6 at the Hotel Jefferson, St. Louis, Mo. Arrangements have been made to give delegates ample opportunity to see the Fair and the list of papers prepared for the meeting would indicate that both a pleasant and profitable convention is assured.

PLANNING BIG MID-SUMMER MEETING.

Secretary W. M. Mackay, of the American Society of Heating and Ventilating Engineers, has issued the official notice to members of the seventh semi-annual meeting of the society, which is to be held in Detroit (Mich.) on July 15 and 16. Hotel accommodations will be announced at a later date, but Detroit is famous for her ability to take care of conventions, so members may be sure of the best that a very hospitable city affords.

A PROMINENT PENNSYLVANIAN.

DAVID HORN, OF YORK, PA.
President of Local Master Plumbers' Association.

The notification is also accompanied by a blank intended to be used by members in proposing the names of heating engineers whom they would like to see enrolled in the society. A referendum vote will be taken in May on all names proposed for membership, so that new members may have the privileges of the convention in July. Members should accordingly send in the names of their friends at an early date to W. M. Mackay, 235 Water street, New York.

Detroit offers many attractions at the season of the year for which the meeting has been appointed and with the memory of the success of former summer meetings still fresh in their minds members of the society will doubtless sacrifice much rather than miss the enjoyment of this meeting.

CONGRESS OF AMERICAN GAS ASSOCIATIONS.

At a recent meeting of the committee appointed by the American Gas Light Association to arrange for a Congress of American Gas Associations it was voted that the meetings of the congress be held in a hall on the grounds of the Louisiana Purchase Exposition, St. Louis, Mo., on Wednesday and Thursday, June 15 and 16, from 10 a. m. to 2 p. m., each day, and also that

System in the Plumbing Shop.

By H. F. Baillet. *

GENTLEMEN AND FELLOW SOFT MARKS: I use the latter term advisedly, for I have come to the conclusion that if you search the length and breadth of our country you will find nowhere and in no line of business a greater percentage of soft-marks than in the plumbing fraternity. Mind you, I do not say the greatest percentage of us are soft-marks, but do say that in no line of business requiring an equal amount of skill, of preparation and of brains, and carrying with it anywhere near the responsibility that our business does will you find so large a percentage of soft-marks as are found in our craft.

That this condition is due in a very large measure to the lack of system in our methods of conducting our business is also an unquestionable fact! Of course, it is comparatively easy to criticise an existing condition, especially when it is so self-evident as the one; but to place your finger upon the exact spot and say this or thus must you do to remedy the defect, that is quite another matter, and it does seem to me that some one of you older in years and experience in the business than Yours truly would have been probably better qualified to elucidate the problem! However, I shall do the best I can with this subject, and if it will only start up some of the rest of you to tell us your little trials and tribulations in this direction, and the remedies you have applied either successfully or otherwise, we will consider that our effort has been well repaid.

It goes without saying that a systematic effort in any direction will accomplish vastly more than double the amount of energy or care will if applied in a hap-hazard, unsystematic manner. This is gently illustrated in the story of the Hebrew gentleman who ran up against a system over in East Newark a short time ago. It appears that in that flourishing community there is a firm that manufacture all kinds of small novelties. They do quite a business, and make it a special point to sell at a moderate margin of profit, at strictly one price only. Now this Hebrew gentleman called there to buy a line of goods and being used to a different method of doing business, he could not quite grasp the fact of one price only. After he had looked over the stock and picked out a number of articles, he asked the price, and was told that they would make it a flat price of a dollar a dozen. He immediately objected, saying, "Dot is too much! I will give you fifty cents." The salesman, who was one of the partners, told him that they made one price only, and if that was not satisfactory he could go elsewhere. The Jew, however, was not satisfied with this, and said: "Now, you needn't get mad about it, I vant to puy de goots, but I will not pay so much; may pe I gif you seventy-five cents, or eighty, but a dollar is too much; if you make it seventy-five I will puy two or three gross." The proprietor, now thoroughly weary of the discussion, said, "You will either pay the price or get to h—— out of here!" And upon the Jew still insisting on a lower price, he grabbed him by the slack of the pants and ran him out of the door. Now it so happened that the office was on the third floor, and when he landed outside of the door he stumbled and tumbled down the upper flight of stairs. Just at that moment the partner was coming up from the lower floor, and meeting the tumbling Hebrew, caught him and said: "Hello, what is the trouble here?" The other partner, hearing this, stuck his head out of the door and called down, "It's all right, Tom; help him along," which Tom proceeded to do by applying his foot where it would do the most good, and helped the poor devil to literally fly down the next flight. At that moment the porter, who was a "Frenchman from Cork," was crossing the lower hall, bearing upon his outstretched arms several trays full of small novelties, on his way to the packing room. Into him the Jew crashed, making sad havoc with the goods. Of course, this roused "Paddy's" ire, and he supplemented the former efforts by bodily throwing the offender down the remaining flight of stairs out onto the street, where he landed very much the worse for wear. The poor Jew was stunned and bewildered for a few seconds, then slowly picking himself up, he gazed with awe-struck face at the door through which he had so lately come and exclaimed in a pathetic manner, "Holy Moses! what a system!"

Now in getting around to different plumbing shops to beg, borrow or steal a fitting or tool that I was temporarily short of sooner than walk a couple of blocks to the shop at which I may have been working at the time; and noting the confusion worse confounded which seemed to reign therein, especially when as in one instance the proprietor of the shop upset a barrel of gas fittings upon the floor and spent with me fifty cents' worth of time

* EDITOR'S NOTE—This able paper was read by Mr. Baillet before the recent convention of the New Jersey Master Plumbers' Association, the convention paying Mr. Baillet and this paper the compliment of requesting that we reprint it for the benefit of the trade at large.

the government of the congress during the session be vested in the presidents of the participating associations, the president of the American Gas Light Association presiding over the governing body and also presiding at the opening session of the congress.

Chairmen of sub-committees were appointed as follows: Committee on Arrangements, E. G. Cowdery, St. Louis, Mo.

Committee on Finance: Wm. McDonald, Albany, N. Y.

Committee on Papers: Walter Clark, Philadelphia, Pa.

Several of the other gas associations have already officially accepted the invitation extended to all of these associations to take part in this congress, have appointed committees to work with the Committee of the American Gas Light Association, and have contributed to the fund being raised by the Finance Committee for the purpose of defraying the expenses of the congress. Similar action will doubtless be shortly taken by the other associations.

TO MEET AT ATLANTIC CITY.

"Not a convention for delegates only" is the fact emphasized by Secretary Henry B. Gombers, of the National Association of Master Steam and Hot Water Fitters, in his announcement of the annual convention of the association to be held in Atlantic City, June 13, 14, 15 and 16. The policy of the association in this respect is a very liberal one, non-members having all the rights of the floor except a vote and admittance to executive sessions.

The St. Charles Hotel has been chosen as headquarters and railroad rates of one and one-third fare for the round trip are practically assured. Atlantic City will be at its best in June and the secretary urges members and non-members alike to drop care for a season and enjoy the breezes of the famous summer resort as the best possible tonic with which to prepare for the summer's work.

"The association, as you know, stands for conservatism in its dealings with manufacturers and jobbers of heating material," said Secretary Gombers in the course of a recent conversation with the DOMESTIC ENGINEERING man, "and we think we are about as liberal in our views as any reputable trade association ought to be, and while liberal yet are very firm in our contention that the trade is immeasurably better off at the present time than it was before the National Association of Master Steam and Hot Water Fitters was organized.

"We are very jealous of the fair name of this association, and believe that the association commands the respect of many men who some years since did not have a very high regard for the aims or the work to be accomplished.

"Acting on our motto 'Who helps me I help' a large number of the members of this association have made friends among the list of manufacturers and dealers on our List in Accord by reason of their favoring them in the placing of their orders, and many manufacturers and dealers have reciprocated by favoring members of this association as against non-members, which is only just and right.

"Please understand our position. We are not in business to publish black lists or to do unfair things, but, on the other hand, prefer to publish a white list or 'Roll of Honor,' as it were, upon which can appear the names of people who are willing to recognize the justice of our claim for protection of members of this association.

"The association has always been a live one, but is now even more than ever wide-awake and looking after the interests of the trade at large, but more especially the interests of our members."

looking for a three-cent gas fitting, I have been strongly tempted to exclaim with our Hebrew friend, "Holy Moses, what a system!"

Order is the first law of nature; man has never yet transgressed this old maxim without paying the penalty thereof. One of the best shop rules that ever was promulgated is the one I for the first time saw a number of years ago posted upon the walls of the Worthington Pump Works at Brooklyn, which read, "A place for everything, and everything in its place." By strictly enforcing this simple rule much valuable time is saved in any and every shop, as well as much profanity and wear and tear upon our tempers. In fact, I am satisfied that the loss of time from this one item alone in the average sized shop will amount to fully 3 per cent on the year's business.

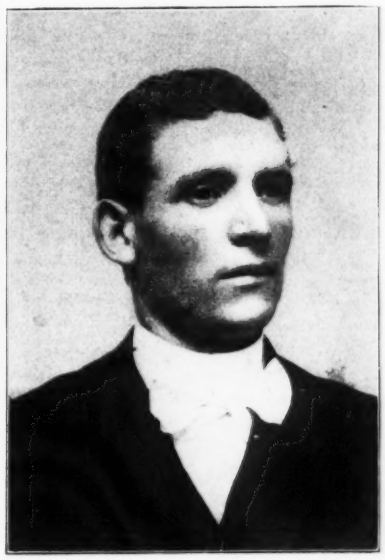
It is often said, when speaking upon this subject, "You can't get the men to do it!" This is, however, largely a fallacy. If when you find a tool or fitting left lying upon the bench you will just leave it lay there, and finding out who left it lie, will call that man or boy's attention to it when he comes in, and make him put it where it belongs, you will not have to repeat the lesson very often. A man who still persists in his slovenly habits you are better off without, as he is too expensive a man for you to keep. In the case of a beginner in business who is boss, journeyman, book-keeper, hostler and general utility man all by his lonesome, it seems at first glance to be a hard matter to live up to this rule. However, it is to him especially of the most vital importance, as it will give him the habit which he will involuntarily keep up, and when he gets so he has occasion to employ a journeyman, he will find it vastly easier in answer to a request for this or that article, to say, "You will find it on the third shelf near the second window," than to say, "It's somewhere around the place; let the boy look for it."

The other excuse, "We are too busy, haven't got time to straighten up," is also rot, pure and simple, as it takes no more time to put things where they belong than to drop them where you stand, only to be pushed aside or laid here and there, handled probably a dozen times, when the one handling in the first place would be all that is necessary, and aside from this the impression made upon the prospective customer is far more to our benefit when he comes into an orderly place than if he comes into a place which would in its disorderly aspect put a junk shop to shame. As a matter of fact, an orderly place is one of the most potent attractions to the stranger who for the first time enters our door; it is like Mrs. Wetzel's pies. General Miles upon his retirement from the head of the army was the subject of some good natured chaffing on the part of his friends because in the order of his retirement the usual eulogistic com-

THREE ENTERPRISING SECRETARIES OF NEW JERSEY LOCALS OF THE N. A. M. P.

ROBERT E. QUINN, OF PATERSON, N. J.
Secretary of Paterson M. P. A.

TIMOTHY J. SCOTT, OF SUMMIT, N. J.
Secretary of Local M. P. A.



WILLIAM P. MORGAN, OF RIDGEWOOD, N. J.
Secretary of Local M. P. A.

PROMOTE MUNICIPAL REFORMS.

"To multiply the numbers, harmonize the methods and combine the forces of all who realize that it is only by united action and organization that good citizens can secure the adoption of good laws and the selection of men of trained ability and proved integrity for all municipal positions, or prevent the success of incompetent or corrupt candidates for public office" is the first object of the National Municipal League, which held its eleventh national conference for good city government in Chicago on April 27, 28 and 29, as the guests of the City Club of Chicago.

The sessions of the convention were held in the assembly hall of the Northwestern University Building, Lake and Dearborn streets. The principal events on the three days' program follow:

WEDNESDAY.

Afternoon—Address of welcome by Frank H. Scott, president of City Club, and Mayor Harrison; response, Charles Richardson; "The Denver Situation and the Rush Amendment," Prof. F. H. Roberts, University of Denver; "The St. Louis School Board; an Instance of Successful Home Rule," Charles Nagel, of St. Louis; "Home Rule Provisions in American Municipal Charters," Dr. Ellis P. Oberholtzer, Philadelphia.

Evening—"Municipal Taxation," Lawson Purdy, New York; "Chicago's Tax Problem," by Chicago speakers.

THURSDAY.

Morning—Report of the committee on nomination reform.

Afternoon—"The Municipal Situation in Cambridge," H. N. Wheeler, Cambridge; "What a Partisan Administration Has Done in New Orleans," J. Pemberton Baldwin; "Municipal Training," Prof. James Mavor, of University of Toronto.

Evening—"Partisanship in Municipal Government," Charles J. Bonaparte, of Baltimore.

FRIDAY.

Morning—"...unicipal Accounting," by E. M. Hartwell, of Boston; Dr. F. A. Cleveland, of New York; L. G. Powers, chief statistician taxation bureau, United States census.

Afternoon—At University of Chicago. Topic: "University and Collegiate Instruction and Research in Municipal Government."

The convention was concluded Friday evening with a dinner at the Auditorium Hotel.

mendation and laudation for past services was missing. He turned upon his tormentors with the following story: "A certain Mrs. Wetzel who was famed for her pies had upon an occasion as guest to dinner the clergyman from a neighboring town. It so happened that on this particular day her pie had gone wrong, and the good woman was sorely vexed at this contretemps. However, much to her surprise the minister was very laudatory in his remarks about the pie. He could not say enough in its praise. This piqued Mrs. Wetzel very much, and she vowed that if he came to dinner again she would make him a pie worth talking about. On the minister's next visit the pie turned out all that could be expected, but much to her embarrassment, he never mentioned a word about the pie. At last she could not stand it any longer, and said to him: 'Now, Brother Spicer, how is this; when you were here before, the pie was poor, and you could not praise it enough; to-day it is first-class and you do not mention it.' 'My dear sister,' came the answer, 'when I was here before I felt that the pie was woefully in need of encouragement, and I tried to do my duty by it; the pie to-day, however, does not need my praise—it talks for itself.'"

Exactly so it is with an orderly shop, as it appeals to our customers, it needs no apology; it speaks for itself. There is one matter which probably causes more dissatisfaction between plumber and customer than all the rest of the happenings combined, and that is the reprehensible habit of giving an estimate on the jump. There are any number of "Smart Alecks" who make it a practice to try and get the plumber to give them a lump figure upon a moderate sized job upon the street, in the theater, thirst parlor or any other old place they can catch him. The result is only too often a misunderstanding, sometimes wilful, very often honest, about the price or the details of the job, which usually ends in your losing on the work, because you feel that you must satisfy your customer, or in your losing your customer, because he or she thinks that you have not done your work, or your price is not as you had agreed upon.

All this can be avoided; you will protect yourself against the sharper, and you will protect the honest customer against any misunderstanding, if you will refuse to give any estimate or price upon a job on the jump. Get your measurements and other data, then go home and take your estimate book (and that is a thing every man in the business should be obliged to have), put down your material and time, then write out an estimate stating just exactly what you agree to do, and what price, keeping a copy for yourself, mail one to your customer.

If the matter is a small one, or one that by its nature you do not care to give an exact price on, always be careful to state approximately an outside figure, and don't forget to put that figure and the date in your estimate book. If on an approximate estimate your bill will come well within the limit, you will have gained a friend. If it, however, goes over it—ever so little—well, you know the rest.

Another matter that proves a source of constant irritation as between you and your customer is very often the matter of bills, and by this I do not mean the amount of the bill, but the time and regularity of rendering the same. This varies with most of us according to how we are circumstanced in regard to help. Those who are in the position where they can and do have a book-keeper are naturally in a better shape to do this systematically than those who are not in so fortunate a position, and again, some of us make a practice of sending a bill immediately upon completion of the work, followed by a monthly statement, while others will bill monthly, and still others at any old time. And as a rule, it is the "any old time man" who will get left. Of course, we must realize that it is really requiring a great deal from the average man to expect him to be a first-class mechanic, a thorough book-keeper, a man at least tolerably well versed in sanitary science, a gentleman and a scholar, all in one poor measly chunk of humanity; especially as the average quality of material sent to learn the plumbing business is, to say the least, mediocre.

However, all this is what is required from us by the exigency of the case. And no matter how simply we keep our accounts, there is just this one thing of prime importance that we should render our bills promptly and systematically, and at no time should a longer period than one month elapse between bills. It may be a long time between drinks, but it should not be a long time between bills. There are often little jobs ordered by our customers which are honestly forgotten. Thirty days is a short enough time to recollect, and if you wait longer than this, the occasion of the job may be honestly forgotten, and a dispute will arise.

The same applies to bills already rendered and credits upon them. At least once every month every customer should have an account of what he or she may owe you. If delayed longer, errors and misunderstandings will creep in, which will be the cause of losing you a customer, or losing a bill, and probably both.

Building on Percentage.

Among the trade conditions that will bear of some discussion is the growing practice of "Building on the Percentage Plan." Some two or three times within the past thirty days some of the evil results of this plan to the plumbing and heating trades has been brought to our attention. The contracting builder, receiving only a percentage on the actual cost of the building, has no particular money interest in keeping the bills for these items down to the lowest point as the larger the item the larger the net return. As a consequence healthy competition is liable to be strangled to the advancement of some favored contracting plumber or fitter. The good side of the same story is that some one does get the work and gets a fair price for it if not an extravagant one, which may in a measure offset the disadvantage of the disappointed contestant who may happen to be low and still lose the job

Warning!

BY ELLA WHEELER WILCOX.

(Copyright by William Randolph Hearst.)

My song is the song of Justice,
And not the voice of a clan;
I plead for a day of fairer play,
When man shall be kinder to man.

My song is a song for Labor,
When labor is in the right;
When it stands for wrong I will pipe my song
For the ill-used man in the fight.

Now this is the right of the toiler—
To work, to rest, to aspire,
To make men heed his worth and his need,
And to carry the pennon higher.

But woe for the cause of labor
When the pennon drags in the dust!
When the theme of its song is only "Be strong"
Instead of "Be strong and just."

And the hope of the world is the toiler—
He has struggled and fought and won.
But a tyrant's sway is but for a day.
Let him think ere that day is done.

Personal Appearance.

Many a boy or girl who has applied for a position and failed to secure it, would be astonished to learn why he failed; but, unfortunately for him, not one employer out of a hundred will tell just what it was that kept him from securing the position.

It may have been an unwashed hand, or worse still, an unwashed ear; it may have been a dirty collar, or a cigarette; it may have been a shifting of the eye or shuffling of the feet; but ten to one, if the boy or girl knew exactly what the trouble was, it would never be corrected. People with habits of that sort seldom correct them. They call the objecting employer a crank, and let it stop at that.

But it does not stop at that. They presently find that every good business man *is* a crank, on one or more of the subjects mentioned. The fact of the matter is that employers have their eyes wide open for bright, energetic young people who can be absolutely depended upon; but that most of them have learned by experience that the ill kept or slouchy young fellow who smokes cigarettes and can't look people in the eye, is a poor sort of an article to have around the place. It isn't a question of morals. It is a question of downright business policy. They want to pay wages to people who can be relied upon; and it takes a clear eye and a neat person to make the right impression upon any good business man.—*Exchange,*

While on the subject of bills, there is another matter of detail which, while it is a matter of first principle in book-keeping and one that everybody knows, we will take up simply as a matter of routine. Every job should be charged up under its date in your day book, or, not to use technical terms, in the charge book; from this it should be posted in the ledger with the ledger page number opposite the charge, and vice-versa, the charge book page number opposite the ledger entry. When a charge is billed, it should be marked "billed," with the date of such billing. A great many people simply check it off as having been billed. The advantage of adding the date when the charge was billed is self-evident. The date of monthly statement should also appear upon your ledger.

When part payment is made it should appear on your cash book, and from there be posted to the ledger, with the ledger page in the cash book, and vice-versa. At the end of each month a statement account should be rendered each customer and your ledger account closed up with balance due showing thereon and the date of such accounting entered. So you can at any time see at a glance just exactly where you are at and the date of rendering.

Of course, it were preposterous in this paper, and coming from me, to pretend to give you instruction in book-keeping, and the reason I mention this detail is this: Some time ago I happened to be in the Second District Court of Newark as a witness, and while awaiting our case to be called they tried a case of suit on a bill; the case was thrown out of court simply because exact dates were not forthcoming. The plaintiff could not produce evidence in his books of accounts rendered and payments claimed to have been made. In making out your bills monthly do not fail to send a bill to your plumber friends for material borrowed or tools loaned. Have on your desk a book labeled "Master Plumbers' Loan Book." When a journeyman or his helper comes in to be helped out, put down the goods, with the date and the name of the firm, and then make the person getting them sign the book; impress upon them the fact that when returning the articles borrowed it will be necessary that they should see that an entry of such return is made opposite the entry of the loan. What is not returned at the end of the month send a bill to the firm. By this method you will not withhold your courtesy and helping hand from your fellow-craftsmen who are worthy of the same, and at the same time you will stop what is in a great many shops a serious leak. Very often the boss is blamed for not returning things when he personally knows nothing of it. And you will probably feel diffident about approaching him on the subject; at the same time you feel that he has been using you for a "good thing." The simple method noted will put the whole transaction on a business footing, where it of right belongs.

It is a well-known fact that entirely too little account is taken of the cost of running a business. If every man knew just exactly what it costs him monthly or yearly to run his concern, be it large or ever so small; there certainly would not be so much work taken at a starvation margin, or at no margin at all.

What is the cost of running your business? This in itself is a very large question which, especially in the building lines, varying with the season and with the volume of business done, is moreover complicated by carelessness in the financial end. By this I mean by carelessness with the small proprietor of keeping personal and business expenses strictly separated. He reasons that, being all his own, it is not necessary that he should account to himself for every cent he spends and how he spends it. It is nobody's business but his own, and for that reason it were folly for him to add a lot of book-keeping to his already numerous duties and cares. As one man expressed himself to me, he tried that for a while, and got so infernally mean over it that he was afraid to buy a cigar.

Nor is this penny-splitting necessary. It is, however, necessary that personal and business expenses be kept strictly separated, and this can be very easily accomplished by simply drawing your week's wages regularly, the same as you pay the rest of your help. Your sustenance is rightly a charge against the expense account, and as such should be entered. Petty expenses, such as car fares, etc., are also a part of the running expenses, and here also it is not necessary to burden the accounting with a multitude of entries; taking a certain amount, say five dollars at a time, and making an entry to petty cash, will answer every practical purpose. Your cost of membership in a trade association, or for trade literature, also are chargeable to this account. Deterioration of stock carried, such as a change in cost price, or by material or fixtures you may carry going out of style, becoming obsolete, or breakage, wear and tear or loss of tools or machinery, losses by unpaid bills are also legitimately chargeable to the expense or cost of running your business. Any man who has thus figured up the cost of conducting his business for the first time will be very much surprised at the result. The remainder of his assets over his liabilities, or rather the difference of this remainder over that of a previous

By the Man About Town.

"You may say that the official records show, without doubt, that the bandit, Niedermeier, was never a plumber," said Chief of Police O'Neill, in answer to the inquiry of the Man About Town on this subject. (One of our enterprising contemporaries of the yellow variety had shown a picture of the condemned car barn bandit in the act of wiping a joint and made the statement that Niedermeier had learned the plumbing business as a youth, which led to the inquiry.)

"So far as we have been able to trace his record, Niedermeier never had time to be anything but a bad man," continued the chief. "He did work in a factory for a while when very young, but soon went out west, where his record in the mining camps shows him to have committed over twenty murders."

As a matter of fact the Man About Town never heard of but one plumber who had gone wrong to the extent of getting a penitentiary sentence, and as he sent us a cane, made with infinite pains out of paper punched from the pages of DOMESTIC ENGINEERING, we conclude that he wasn't a half bad fellow.

* * *

The old saying that doctors never take their own medicine is well illustrated in the rooms of the Chicago Master Plumbers' Association, which for upward of three months have been giving off a sound strongly suggestive of babbling brooks and shady rills. Incidentally it wastes a few dozen gallons of water every twenty-four hours, but as the continuous flow insures a cooling draft for every weary wayfarer who may chance to drop in at headquarters, it is not without its compensations.

* * *

"The Chicago Federation of Labor is to be given another chance to recognize our steamfitters," said L. W. Tilden, of the United Association of Journeymen Plumbers, Gas and Steam Fitters, when questioned as to the action of the executive board of the American Federation of Labor, in session at Denver recently. "Not unnaturally the board desires to persuade rather than force the local Federation to compliance in this matter. There is no reason why this matter should not be settled amicably but it cannot be settled right until the Chicago Federation seats delegates from the only steam fitters' union recognized by the national body."

* * *

"You may say that there is absolutely no foundation to the rumor that plumbing will be taught in the schools, at least so far as the superintendent's office has been advised," was the emphatic denial given by the desk clerk, when asked about an editorial on this subject which appeared in the *Tribune* recently. "I really can't imagine how such a rumor could have originated unless it be from the fact that by mutual agreement of the masons and their bricklayers' union apprentice boys are to be given an opportunity to attend school for three months out of the year. In their case a special course in architectural drawing has been thrown open to them, but that is all. When the Board of Education decides to teach the trades in the schools they will have to give each boy a chance to learn the trade of his choice and that would be undertaking a pretty big contract."

* * *

"I should say that one could hardly overestimate the value of a periodical getting together of the traveling representatives of any house," said W. A. Cameron, of Kellogg-Mackay-Cameron, apropos of the convention of their salesmen in Chicago recently.

accounting, will be the legitimate profit. And it is certain that this legitimate profit is in our line of business, even under the most favorable circumstances, but a small percentage of the amount of business done.

Always remember that your wages are not a part of the profits of your business; they are a part of your running expenses, and should be so considered. It is impossible to arrive at a satisfactory knowledge of your legitimate profit without drawing up a statement of your affairs periodically; of course, the oftener this is done and comparison made with similar previous statements, the closer will be your touch with your business, and the better will you be able to direct it to a profitable result. This should be done at least once a year, as without it you cannot run your business systematically; in fact, it is a case of hap-hazard, and while the chances are about even that your natural business shrewdness will pull you through advantageously, it will be a case of your business running you, and not of you running your business. And if the year has brought you reverses you will not be able to ascertain the cause thereof and intelligently apply the remedy to prevent a re-occurrence of the trouble.

A man once put an advertisement in the daily papers for a wet nurse. Among the applicants for the position was a young girl apparently about 16 or 17 years of age. The gentleman was rather taken aback at the youthful appearance of the applicant, and proceeded to question her, about as follows: "Well, what can I do for you?" "I have come in answer to the advertisement for a nurse." "But I want a wet nurse." "Yes?" "How old are you?" "Oh, I'm old enough, I guess." "Well-er have you ever been married?" "No." "Now-er-the fact is I advertised for a wet nurse, and I hardly think you know just what is required." "No, I don't; but I'm willing to learn." Just so in business life; we do not always know just where to look for the reason of a comparatively unprofitable season, but we should be willing to learn, and we positively cannot learn without we put our house in order, and see just where we are at. We also owe this as a duty to our families, and to those with whom we have business connections.

There may come to all of us periods of temporary financial embarrassment, when a little extension of credit would be of considerable value to ease us up for the time being. There is no business house in the country who, if you can show them a clean statement of your business affairs, will not assist you as far as lies in their power. And they are justly entitled to this consideration and knowledge, and will each and all of them respect your confidence when you can show them you are worthy thereof. But you cannot, with any show of justness or fairness, expect any business house or any bank to simply take your word for it when you do not really know yourself just exactly what you are doing and where you are at.

Among my acquaintances I count a furniture dealer who is occasionally called in by fire insurance companies to appraise fire losses on goods in his line. Recently we were conversing upon the peculiar difficulties he encounters in trying to satisfactorily fulfill his duties in that capacity. In this conversation he made one remark which becomes of interest at this time, and it was this: "If every business man would only take an inventory of his stock and fixtures annually or semi-annually, there would be comparatively little trouble in arriving at a fair adjustment of fire losses, but when, as in so many cases with a small business, there is no inventory, the man is practically at the mercy of the insurance companies, as it then becomes a very hard matter for him to go into any court and fight the company, simply because he has poor or no legal evidence of his losses. Where an inventory of comparatively recent date exists, and the party is known as an honorable business man in the habit of doing straight business, the companies will rarely try to avoid a fair payment of loss based upon the inventory, as they know there is legal evidence to prove the loss, so for this reason alone, if for no other, the value of having legal evidence of the value of the contents of your place of business becomes evident.

Aside from this consideration it is utterly impossible for any man to arrive at a correct statement of his affairs unless he knows the value of his stock, tools, machinery, fixtures, etc., at stated given periods. In spite of which fact we all know that fully 50 per cent. of our master plumbers never take account of their stock, or do so spasmodically.

After having the above conversation with my friend, I met a boss plumber who does probably three times the amount of business that I do, and whom I know to be in prosperous circumstances. Upon asking him if he knew the value of his plant, he replied: "Oh, about seven or eight hundred dollars; I have never figured it out." Now, merely as an illustration, my inventory taken December, 1903, comprises eight hundred and twenty-four different items—or over 3,000 separate articles—amounting to a conservative value of nineteen hundred and ten dollars; and I am sure, from knowledge of the other man's place, that the stock he carries is at least as valuable as mine, if not more so, and it is safe to say that every man who has never, or only cursorily,

"Of course it is a trifle early for me to speak as to the permanent benefits of such a gathering, but judging from the interest manifested at the meetings I am sure our boys cannot fail to take home with them a large measure of renewed zeal and many practical hints which are bound to prove useful in their work.

"But quite apart from what they carry away with them, I believe such conventions justify the expense because of the strengthening of the bond of fellowship which must naturally result when a lot of good fellows with common ties and common interests, get together. It is the best possible lubricant for the machinery of business. The men learn the aims and ideals of the house, and the management gets a better idea of the particular problems which confront their representatives in territories far removed from the home office.

* * *

The Man About Town found Perry L. Hedrick, newly appointed chief of the sanitary bureau of the Chicago Health Department, busily engaged in gathering up the threads of office routine and modestly disinclined to talk for publication. The few hours he had been in office he pointed out, had not been sufficient to give him an adequate grasp of the situation, while his policy would, of course, have to shape itself after due observation of conditions. Evidently Mr. Hedrick is a man who believes that actions speak louder than words and it is equally manifest that he proposes to stand or fall by the record he makes in his discharge of the duties of the office. Only on one point did Mr. Hedrick consent to be quoted and that is that he is entirely open to friendly suggestion and criticism and will welcome from any quarter advice designed to make more effective the work of the bureau.

* * *

A. H. Greene, purchasing agent of the American Radiator Company, is responsible for the following story, although he does not vouch for its absolute accuracy in all minor details. However he had it straight from a friend who had been told by another friend who has a very dear friend who was actually present when it happened.

It seems that the rector of one of our leading Chicago churches was more godly than sophisticated and, innocent of the slang phrase, announced as his text, "Someone touched me." After the manner of pulpit orators he rounded his periods by repeating the words at frequent intervals so that the congregation was pretty well used to them by the end of the sermon. They were hardly prepared, however, for his announcement that during the taking of the offertory the choir would render the anthem, "Search me, O Lord," and the unexpected coincidence proved almost too much for the risibilities of some of the congregation.

* * *

The following sad story is going the rounds of the Chicago trade: A prosperous plumbing contractor, who shall be nameless, sought admission at the pearly gates. "Who are you?" said St. Peter. "I am a Chicago plumber." "What have you done that entitles you to admission?" "Well, I saw a decrepit woman on La Salle street the other day and gave her two cents." "Gabriel, is that on the records?" "Yes, St. Peter, it's marked to his credit." "What else have you done?" "Well, as I crossed the bridge the other night I met a newsboy half frozen to death and gave him one cent." "Gabriel, is that on the records?" "Yes, St. Peter." "What else have you done?" "Well, I can't recollect anything else just now." "Gabriel, what do you think we ought to do with this fellow?" "Oh, give him back his three cents and tell him to go to hell."

taken account of stock will be very much surprised to learn the value thereof. And without this knowledge how can he expect to know what he is doing or where he is at? There are also any number of men in the business who are virtually bankrupts without knowing it; they keep jogging along, making Peter pay Paul, and when finally the inevitable takes place, they do not know how it happened; while if they had given themselves an honest statement of their business affairs, their assets and liabilities, they would have known of it in time to have remedied the defect in their manner of doing business, or could at the worst have given up in time to have retained their business reputation as honest men, instead of being branded in the business community as "skins," and have spared the trade the odium of another failure. There is no question but that fifty percent of the failures in business life are caused by lack of system in conducting a business.

The charging up of work by your employes immediately after completion of work instead of weekly or biweekly and checking up these charges; the matter of tools, ladders and materials left on buildings and reporting of such fact; the keeping track of goods received and placed in stock, their cost and market value; the relation of the cost of unproductive help to the amount of business done and to the relative profits; the stock necessary to carry on your business and its ratio to the amount of business done; also the close following up of the cost to you of contract and estimate work; these are all matters which allow of the application of systematic endeavor and where the application of some simple system strictly followed out will be of great financial benefit to you.

This paper has already grown to larger proportions than I had intended, so I will cite just a few more instances where introduction of system will prove advantageous. The one is regarding price lists; it is amusing in the extreme to what trouble the most of us are put to tell the cost price of—I won't say fixtures, but of the seven or eight hundred articles that we are using during the business year. It is a fact that not one-half of us if we were questioned at this minute can tell what we paid for the last lot of soil pipe we bought without either looking up the bills or figuring out the discount on a sheet of paper, nor can we tell for the asking what the last fuller balls we purchased cost us per hundred or thousand or dozen, as we may severally buy; and with the vast number of different articles we use and handle it is beyond the possibility of human mind, with the ever-changing prices, to know this. Still we are expected to give a price on a job into which probably anywhere from a dozen to a hundred of these articles enter at five minutes' notice.

One of the necessary aids to the injured at this juncture is a price book; it need not be a bulky affair, but just a desk book, alphabetically indexed, wherein to enter in pencil the cost price of the various most generally used articles; when you get a bill for goods you can in a moment compare the price charged with the last price paid, and if no satisfactory reason apparently exists, why you have been charged more this time than the last, you have a casus belli against your supply house. If, on the other hand, there exists a sufficient reason why the price you are charged should be higher or lower than the previous one, you can readily note the change and will always have the latest prices before you, and if found convenient, you can attach thereto a selling price which will by this means also be kept up to date with very little trouble. This price book will be found of great value in estimating, in making up your inventory and in numerous ways.

Another matter is advertising. There is practically no way in which money can be more easily thrown away than in this direction. Proper systematic advertising is of great value, but how many of us do any amount of this? Very few. The most of us throw away at least enough money in programmes, tickets and the dozen and one different schemes of advertising to please our customers to keep us in hats and shoes the year around, and the worst part of it is that once you indulge in this pastime, you are considered a mark for every "Social Club" or Christian Endeavor Society that wants to run a ball or church supper. You are pestered to death and when you yield to one, you must to the other for fear of giving offense.

If you wish to consider advertising at all in your business, you must do it persistently and systematically in order to reap any benefits therefrom. If you are not prepared to do this, let it alone entirely. I believe it was the late Henry Ward Beecher, the well known Brooklyn divine, who, upon being reproached for some action that did not thoroughly square with his advice from the pulpit, said: "You must do as I say, not as I do." So I can close this paper by telling you that in common with the most men I do not myself always practice what I preach, still I know from what parts I have practiced that a little more of the same kind, like the minister said upon being introduced to hot Scotch, would do me and all of us a great deal of good.

Something for Almost Nothing.

Another remarkable invention for getting the best of Mother Nature comes to us from St. Joseph, Mo., and, as usual, a stock company has been formed to exploit it and erect a factory for its production.

The invention, we are told, "will doubtless prove the greatest invention of the twentieth century," a statement that shows large prophetic powers at least, and is a heater which is to "produce heat and power without combustion." It is to do everything that is now done with smoky coal at "less than one-half the cost" of "any other known process." There is to be no more going down to the cellar in the early morning and in abbreviated attire, with the thermometer 20 degrees below zero, to find the furnace fire out, the fortunate owner of the apparatus having only to turn himself over in bed and touch an electric button in order to start the apparatus and have the house warm and comfortable at breakfast.

The apparatus, which is the result of over twenty-three years of work prosecuted in the midst of "many seemingly insurmountable obstacles," is thus described by the St. Joseph *Press*:

"The principal parts of the mechanism are a double cylinder, and a spindle, not unlike a wire gun cleaner. In the working model now on exhibition in the basement of the First National Bank building, the cylinder is about 3 feet in length, and the spindle, which revolves inside of it, is of equal length. The cylinder is about 12 inches in diameter; the spindle 6 inches in diameter. Inside the outer jacket of the cylinder is another smaller cylinder of brass, the space between being filled with water. Inside this smaller cylinder revolves the core or spindle, which rubs against the brass casing, creating the friction which heats the water.

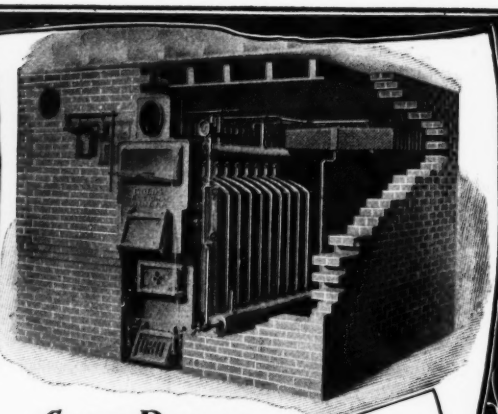
"The motive power used in producing the friction, which produces the heat in this friction heater, may be electricity, gasoline, gas, water, wind or any other power, and the power required is very light. In the case of street cars, raliroad cars, automobiles and carriages the heater can be attached to the axle, and the revolution of the wheels of the vehicle will furnish the motive power."

Our readers are well-known to be afflicted with that superior knowledge which sometimes scoffs at the productions of unknown inventors, says the *American Machinist*, in commenting upon the claims of the inventor. Should they be skeptical about this one we will remind them that Dr. Lardner is said (untruly, to be sure, but that does not injure the story) to have predicted that a steamship could not cross the Atlantic. Moreover, the invention is patented "throughout the civilized world," and what better proof of merit could it have than that? Knowledge of nature's laws has, of course, a certain degree of usefulness. When an invention is of limited scope or is merely a new application of old principles, such knowledge has been known to detect fallacies and point out pitfalls, but there are cases when the broader view of pristine ignorance is necessary to the comprehensive sizing up of a revolutionary invention. In the present case we are told that the invention "is destined to revolutionize all ideas with reference to the methods of producing heat and power." Under such circumstances a knowledge of a few fundamentals is of no avail—at any rate of no avail in convincing a few promoters and investors that they are engaged in a wild goose chase. It is necessary to wait until someone has exchanged some good money for some equally good experience.

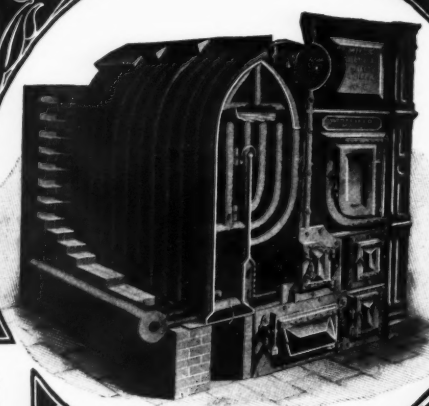
THE H.B. Smith Co.
WESTFIELD, MASS.

SALESROOMS
133 CENTRE ST.
NEW YORK CITY.

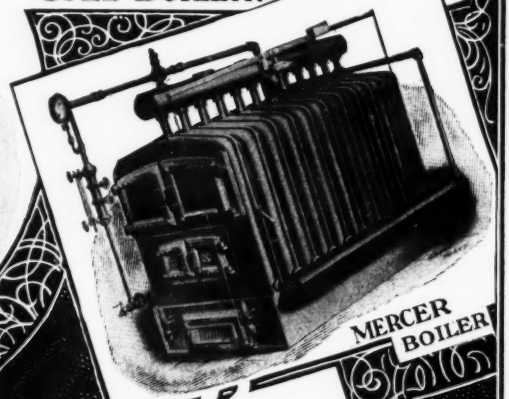
704 ARCH ST.
PHILADELPHIA
PA



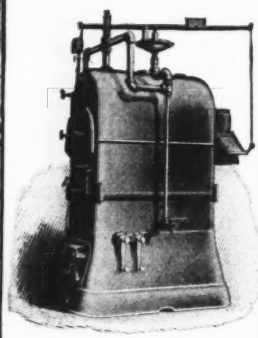
GOLD BOILER.



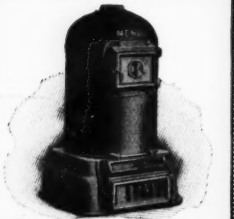
MILLS BOILER.



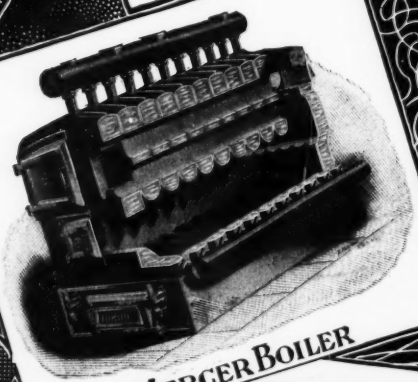
MERCER BOILER



COTTAGE BOILER



MENLO HEATER

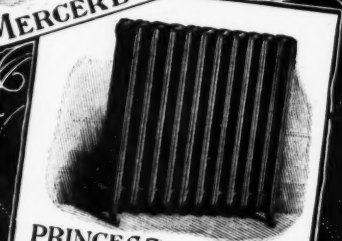


MERCER BOILER

COTTAGE BOILER

PACIFIC COAST AGENTS.
HOLBROOK MERRILL
& STETSON.
San Francisco, Cal.

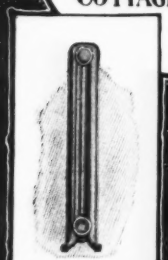
X-RAY



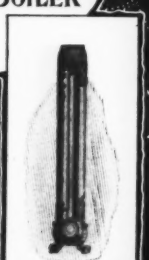
PRINCESS

GOLD PIN

SCHOOL PIN

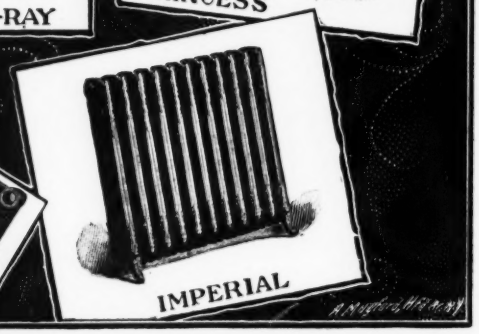


DIADEM



CORONET

EUROPEAN
AGENT.
AUG. EGGERS.
BREMEN & NEW YORK CITY.



IMPERIAL

Description of Hot Water Heating Apparatus in the Schioldann Institution, Copenhagen, Denmark.

Read before the American Society of Heating and Ventilating Engineers

By Captain A. B. Reck.

I BELIEVE I am not much in error in supposing that the most you have heard about Denmark, gentlemen, is that cows are almost as numerous there as the human beings of the country, and that said cows are well assisted by said human beings in every year converting many shiploads of American corn and oil-cakes into Danish butter, to be eaten by your kinsmen in England.

Therefore, before describing an example of heating, as performed in a Danish building, and especially because I think the method employed is new to you, it perhaps may not be out of place to begin by saying a few words about the climate and other conditions that effect methods of central heating in Denmark.

First, as to temperature, it will be sufficient to say that it is customary

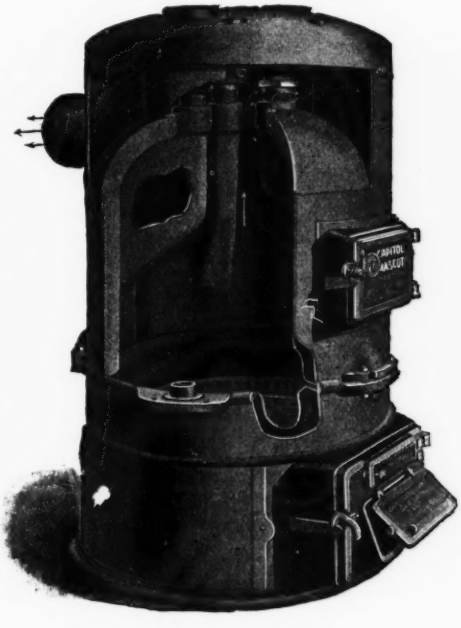
COMMENTS

Wise and Otherwise, by the Roadside Philosopher.

Spring, balmy spring, is in the air, and no doubt you will now meet openly on the public street the hitherto invisible heating liar, who with the blandest assurance will tell you he hasn't had a complaint this winter. The reason we haven't seen him before is because he has been sitting up nights singing the eternal covering off several of his jobs trying to hoist the long suffering thermometer up to the point where it would thaw out the final payment.

* * *

Our observation is that an architect if allowed to sketch the positions of radiators on heating plans is less likely to disturb them when the job is "done," than is the case if we do the sketching. He seems under the circumstances to grasp more readily the reason why it is expensive to shift things all over the house—afterwards.



THE CAPITOL-MASCOT WATER BOILER.
(SECTIONAL SERIES)

The Capitol-Mascot Boiler

The only round fire pot, vertical sectional boiler on the market is unequaled for burning soft coal and is also a complete success with hard coal.

Note its ample combustion chamber and large area exposed directly to the fire making it selfcleaning and absorbing all of the heat.

Write for new price list.

United States Heater Company.

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BRANCHES:

NEW YORK, 129 Worth Street. CHICAGO, 42 Dearborn Street.

SALES AGENTS:

New England—The Capitol Supply Co., - - - - - - Springfield, Mass.
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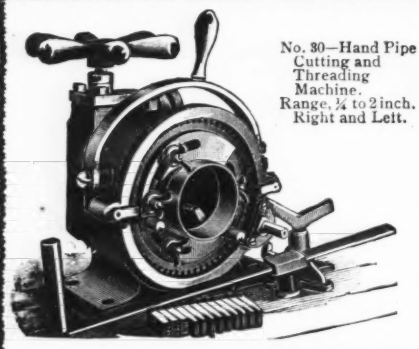

No. 30—Hand Pipe Cutting and Threading Machine. Range, ¼ to 2 inch. Right and Left.

SAVE TIME AND LABOR. WITH A

FORBES' PATENT DIE STOCK

and one man you can cut off and thread a 12-inch pipe with ease. Smaller sizes proportionately easy.

Ratchet Drills, Ratchet Die Stocks, Malleable Iron Pipe Vises

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THE CURTIS & CURTIS CO.

18 GARDEN ST., BRIDGEPORT, CONN.

with us to provide heating surface in the rooms sufficient to give an inside temperature of 68 degrees F. for an outside temperature of 4 degrees below. As you will see, this makes a difference of 72 degrees F. between outside and inside, or only a very little more than 70 degrees F. which I understand it is customary to provide for in most parts of the United States.

I have to explain to what extent the outside temperature is variable during winter. You know that Denmark is situated just between the North Sea and Sweden. The result of this situation of the country is that the climate in most winters is extremely unsteady. After a period with mild western winds, there can suddenly follow from the North Sea a considerable drop in temperature, if the wind swings East and comes from Sweden. Consequently our heating apparatus must be capable of dealing with very sudden and considerable drops in temperature.

Next, as to winds; the fact is that often in winter strong winds are blowing for weeks over Denmark. I think you will really find less people wearing high hats in Copenhagen than in any other European capital.

From all this I think you will see, gentlemen, that the task of the heating engineer is not easier in Denmark than anywhere else. Perhaps it is even a little more difficult. Only, in one respect, the Danish engineers have nothing to complain of; if they have a really good thing to propose, a thing that is advantageous from either an economical or a sanitary point of view, they do not find the people of their country slow to adopt it. That applies to other branches of engineering just as well as to heating and ventilating.

For instance; I dare say that few cities have better water and better sewers than the city of Copenhagen. No sewage is allowed to go into the harbor, but all is pumped out into deep water with a strong current, far away from the town.

As to heating, we have in Denmark gone through the whole series of systems, from stoves to hot air furnaces, from these to steam heating, and from steam to hot water.

The objections to steam heating that have produced the last named change are mainly:

Deficiency in regulation of temperature in rooms, and too much heat in all ordinary weather; therefore, too much coal consumption.

Difficulty in keeping the apparatus in order, especially if the steam system employed includes the use of many steam traps or automatic air valves.

Last, but not least, the cost of repair work, especially on the returns. These very often have to be replaced after twelve to fifteen years' use.

I shall now give you a brief description of the heating installation my company has done in the Schioldann Institution in Copenhagen, this installation being a fair example of about two hundred similar installations made by my company and its European licensees in the last few years.

The system employed is a low pressure system, the water circulating in the apparatus by the influence of difference in specific gravity between the ascending and descending columns of water. The special feature of this system is that all heat is transferred to the water by low pressure steam and that whenever the pressure of the steam is raised a few pounds over that ordinarily kept, the water will be heated to the boiling point in the flow mains without danger from the expansion tank, and at the same time the velocity of the water will be accelerated to about four times as much as what is attained in an ordinary low pressure hot water apparatus.

Some men succeed in getting several different kinds of reputations. Some swell new varieties we hatched this winter in the heating business. Call the roll. Here!

* * *

"A man can never gain the favor of a woman by arguing with her." Correct. Just gently tell her she's running the boiler better than you can yourself, and that a ton per month is the proper limit; wind it up gracefully by presenting her with the job as a gift. Might as well.

* * *

The carpet that gets spoiled is always four dollars a yard.

* * *

"How happy could I be with either,
Were t'other dear charmer away."

Strange impression abroad that a fermented lover wrote the above lines. Perfectly absurd. The real thing was in the heating line, and was inspired by the presence of a boiler salesman on either hand both cooing for the same order.

* * *

Little drops of water
Little holes of sand,
Make our mighty profits
Shrivel to beat the band.

Too much truth in the above to make good poetry. As our friend Dinkelspiel says about the gas meter, "Id makes a twenty-dollar bill get red in der face, and a bank book get up and leave der room."

* * *

Because of our unquenchable thirst for knowledge we became immersed in a scientific discussion a short time ago, in which it was demonstrated to us that a bottle of Scotch, placed within reasonable distance of a new steam boiler, had a wonderfully beneficial effect on its operation.

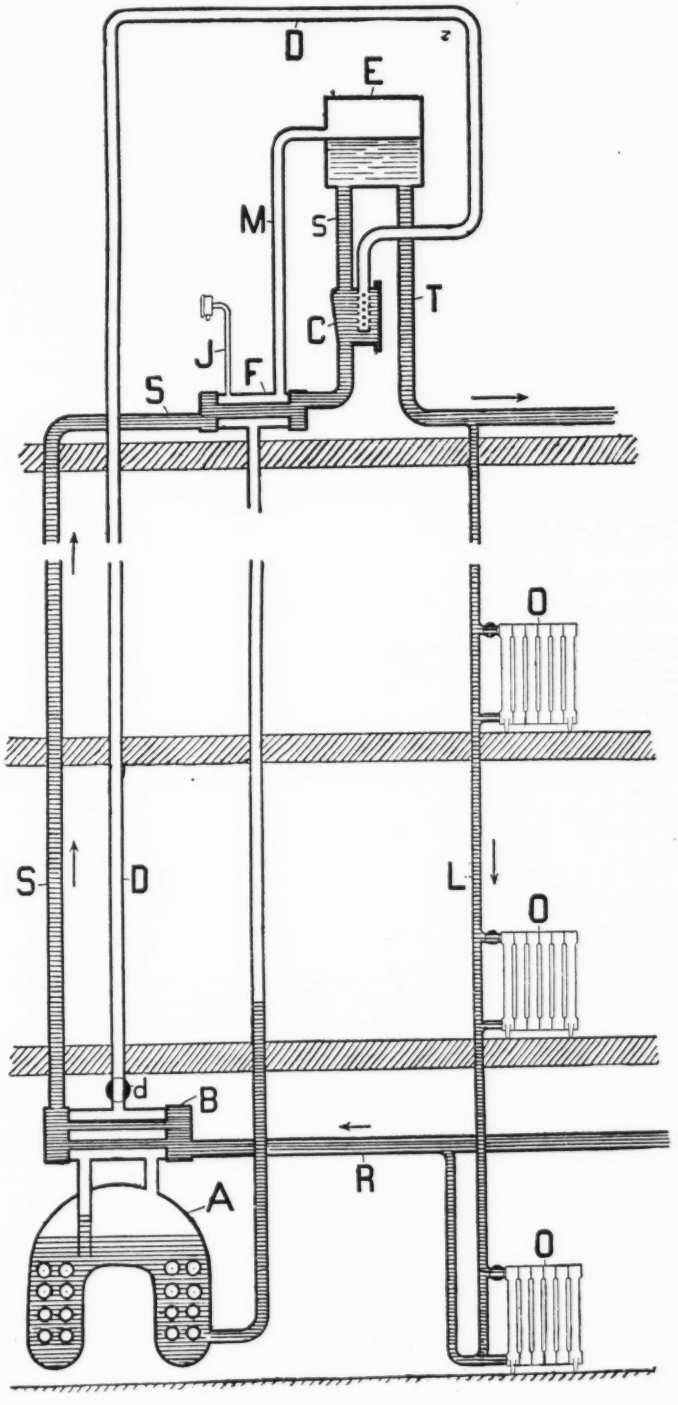
We refer, of course, to the operation of the boiler. We are temperate ourself, but must give credit where credit is due, even if it jars all the vatted principles of our makeup.

We are not certain whether the stuff was utilized as a fuel or was merely applied to the flue. Anyway, she worked, brothers, she worked.

* * *

Ever feel sad when you see a "kit" come back to the shop from a job? Of course it's depressing to know sometimes you haven't another job to send that kit to right away, but that isn't what we mean. It's the look of the tools we refer to, the dejected appearance of the pipe wrenches with not a whole tooth left and the handles bent into the form of a boomerang, the pipe cutters suggestive of having been made

The possibility of elevating the temperature of the water in the flow mains of a low pressure hot water apparatus to boiling point gives a considerable saving in heating surface without danger of overboiling and, at the same time, the great augmentation in the velocity of the water permits going much further from the boiler with the mains, and using only about one-fourth the sectional area in all mains and risers, as compared with the



HOT WATER HEATING APPARATUS IN THE SCHIOLDANN INSTITUTION. PLATE I

ordinary low pressure hot water apparatus. How this is attained will best be understood by looking at the accompanying explanatory sketch of the system. Fig. 1.

Steam is here shown taken from a low pressure steam boiler, A. The type of boiler shown is that used in the Schioldann Institution, but any type

to cut "square" pipe, the compass handle without the saw, the hammer with a half moon chipped off its face, and so on all down the line.

Some say the tools are not made as they used to be; "ditto" the pipe. Others say maybe the boys are working harder.

* * *

Steamfitter (just through with hot water job, busy showing owner and his wife how he had filled the apparatus)—"This is an air vent."

Mrs. O. (excitedly)—"Oh, dot's vere de breeze coumes oud, hey?"

Mr. O. (disgustedly)—"Ach, naa! Don'd he say dot's de vind, de vind place alreatty?"

* * *

"Experience is a herb that grows in every man's garden." This is part of our crop. Cold day. (Chestnut) Emergency call. (Another) Take fitter off other important job. Heating boiler given out. Orphan. Never christened. Oldest inhabitant gives it up. Baby sick, must have heat at any cost. (This is usually put to you as though millions were behind it.) Fitter removes four cubic yards brickwork. Discovers boiler. Four tubes screwed into head of boiler burned out. Send measurements to shop for new ones. Can't get 'em in. Discover old threads are special, thirteen to the inch, bad luck to them. Get down on bended knees to six different machine shope before strike idle lathe. 'Nother fitter and valet forwarded. At fitter's profane request, per 'phone, we arrived. Off coat to assist. Steam up 3 a. m. Homeward bound 3:30. Nix trolley. Cast anchor 4 a. m. and don our sackcloth pajamas. Ashes soaked in already. Bill rendered. Invited to go some distance to collect. After looking up the rates, settle for one-half the bill sooner than take the trip.

P. S.—Verily, "nothing is more precious than time, yet nothing is less valued." This last is a quotation, and we feel constrained to say that the author was on to his job.)

ADVERTISEMENT.

When Cleopatra, wise old girl,
Got gay one night and drank a pearl,
All frugal folk cried out, "For shame!"
But marveled at her, just the same.
And she was right and she was wise
To thus get in and advertise.

When Cheops made his subjects bid
On contracts for a pyramid,
He got a tomb well worth a king
(Though not a very useful thing),
But he was right and he was wise
To thus get in and advertise.

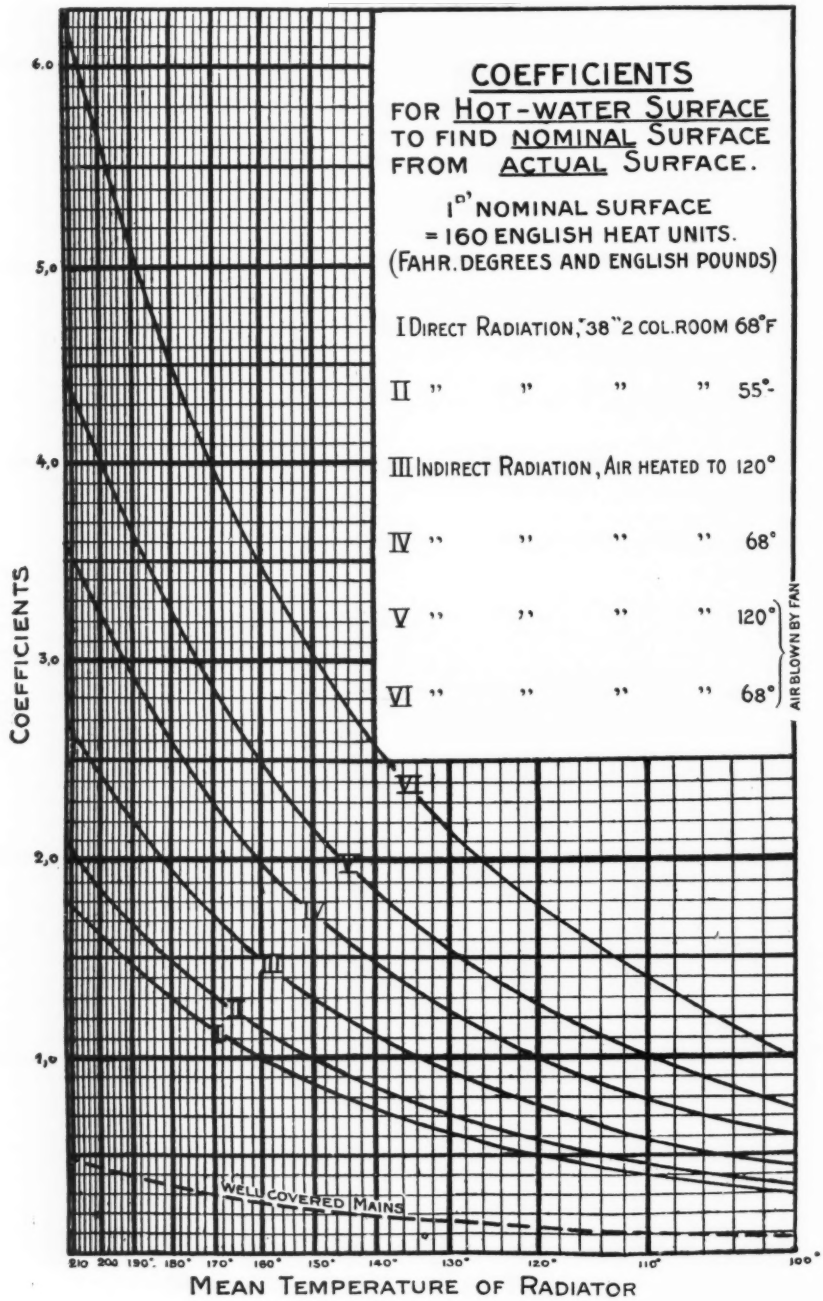
When old Diogenes began
Pot hunting for an honest man,
His chances for success were slim;
But folks began discussing him—
But he was right and he was wise
To thus get in and advertise.

When Dr. Johnson made a spree
Of forty-seven cups of tea
He surely showed his savoir faire
By having Mr. Boswell there—
But he was right and he was wise
To thus get in and advertise.

Blame not the actress out of funds
Who plans to lose her diamonds;
Blame not the millionaire who capers
To get his actions in the papers;
They've little to immortalize,
But they at least can advertise.

—*Life.*

of boiler can be used, and even the exhaust from a steam engine is as good a source of steam as a low pressure steam boiler. The steam is first taken into a reheater, B, where it heats through metallic surfaces the water of the hot water apparatus coming from the return water main "R," and passing through the reheater to the main rising hot water pipe, S. The metallic surfaces in the reheater, B, are generally made large enough to heat the water in S to a temperature of 185 degrees F., but the admission of steam to the reheater, B, can be regulated automatically, or by hand, to


COEFFICIENTS
FOR HOT-WATER SURFACE
TO FIND NOMINAL SURFACE
FROM ACTUAL SURFACE.
1 SQ. FT. NOMINAL SURFACE
= 160 ENGLISH HEAT UNITS.
(FAHR. DEGREES AND ENGLISH POUNDS)
I DIRECT RADIATION, "38" 2 COL. ROOM 68° F
II " " " " 55°
III INDIRECT RADIATION, AIR HEATED TO 120°
IV " " " " 68°
V " " " " 120°
VI " " " " 68°
AIR BLOWN BY FAN
COEFFICIENTS
6.0
5.0
4.0
3.0
2.0
1.0
WELL COVERED MAINS
210 200 190° 180° 170° 160° 150° 140° 130° 120° 110° 100°
MEAN TEMPERATURE OF RADIATOR

HOT WATER HEATING APPARATUS IN THE SCHIOLDANN INSTITUTION.] PLATE 2

give any lower temperature desired in the rising pipe, S. This pipe, S, ends in the expansion tank E, but before it enters here, there are inserted in it two special apparatuses required by the system: the condenser F and the circulator, C, to be described later. These two apparatuses, however, do not impede the flow of the water from the reheater, B, to the expansion tank, E, so if the expansion tank and the reheater are connected by any ordinary system of hot water mains, pipes and

FROM THE OUTPOSTS.

From our correspondents we are in receipt of letters which indicate the business prospects in their various localities. These will prove interesting and suggestive:

J. B. Slinn, Chillicothe, Ill.—In regard to the amount of plumbing and heating in this place this year as compared with former years, I do not see any change; my trade is about the same as the last four years, and while there is a certain amount of talk in relation to increase in price of building material, I do not notice any falling off in the building. Of course our town is small with not an excessive amount of work in my line, yet it is in keeping with the size of the place.

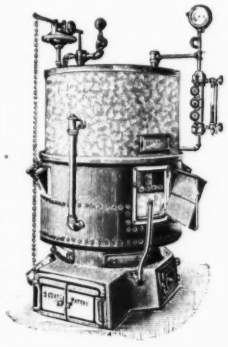
Edwin G. Osgood, Bellows Falls, Vt.—The business outlook seems to me good. I am entirely new at the business, but hope soon to grow into it. I should say there was going to be quite as much building as in years previous, and the class of houses will be good houses, too. Prices are, to be sure, high, but I think people will build just the same.

C. R. Haine, North Bloomfield, O.—I am going to build a nice home and know of several more here who will also build good residences.

A Pacific Coast Correspondent.—My reports from Portland are very discouraging. It is very quiet in San Francisco. Today is the quietest run in months. Still I feel sanguine the year will wind up at least fair. The late season has delayed many things, but the crop prospects are good and should bring a good summer and fall trade.

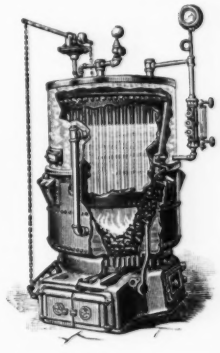
Garland Electric & Plumbing Co., Ashland, Wis.—The plumbing and heating business is about a month late this year, compared to what it was last year. The overhauling and repairing jobs are about the same as last year. The business in the future looks very good, if the labor trouble don't set in. We will be moved in our new building about May 15 with a full line of electric and plumbing supplies, such as the trade demands. We will be in a position to manufacture electric and gas fixtures.

R. D. Hopkins, Engineer, Rossman & Bracken Co., 132 East Forty-second street, New York:—Our impression of the heating and plumbing business for the ensuing year is that business will be generally fair. We do not anticipate, however, any special boom, such as we have had in the last two or three years. At the present outlook, we think that the character of the work ahead of us is in large buildings, such as hotels and office buildings, etc., the private residence work has been greatly reduced in the last eighteen months within the limits of New York City. Undoubtedly the recent labor troubles have somewhat checked building operations, from the fact that investors are afraid to risk having their money tied up in building operations during a long season of strikes. The labor situation, however, is rapidly settling itself to an even working basis and we see little reason why there should be any trouble this season. The price of building material, we do not deem excessive, especially in our line. We might also mention that we are under contract to furnish the heating and ventilating work at the addition and alterations to the Gouverneur hospital, Gouverneur Slip, N. Y., also the new Harlem hospital, 136th street and Lenox avenue, also public bath building, West 60th street, public bath building East Eleventh street, public bath building East Seventy-sixth street, public bath building Montrose avenue, Brooklyn, and public bath building Huron street, Brooklyn. Also the heating, ventilating and plumbing work for the residence of G. L. Boissevain, Mt. Kisco, N. Y. The aggregate of these contracts, including the Willard-Parker work is over $250,000.



GORTON SIDE FEED

For Steam and Hot Water Heating BOILERS



Send for New Price List

Gorton & Lidgerwood Company

96 Liberty St., New York; Old Colony Bldg., Chicago; 77 Oliver St., Boston, Mass.

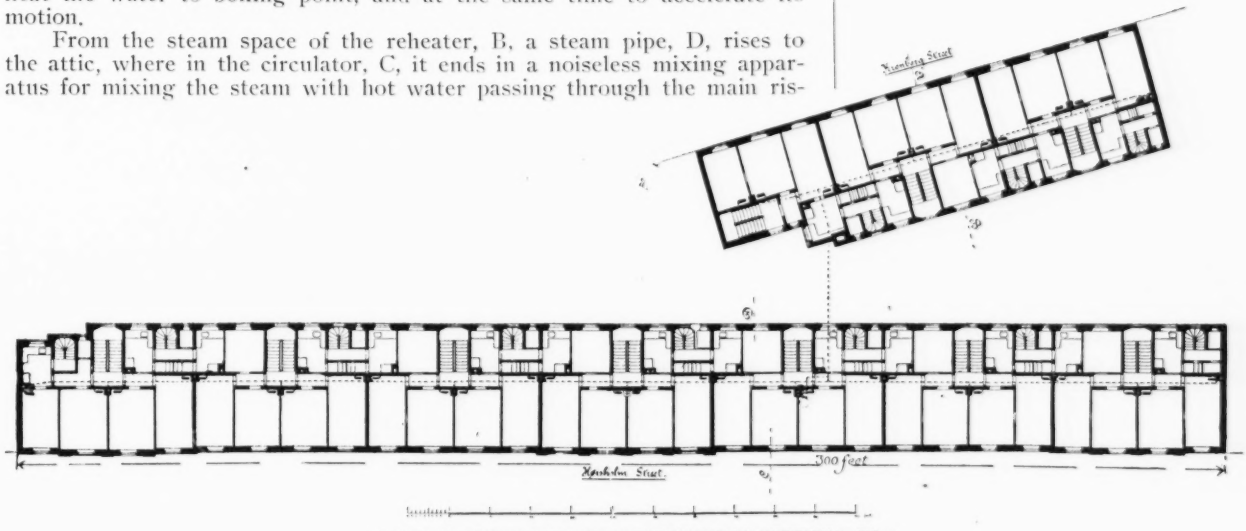
radiators, in which the water is giving off heat to the building, you will see that it will be possible to work such a hot water apparatus at all temperatures below 185 degrees F., the reheater "B" replacing the ordinary hot water boiler in every respect.

In the sketch, the flow main "T" of the hot water apparatus is shown placed in the attic of the building, and the radiators, O, are shown connected to the risers on the one pipe plan. This is shown so only because said one pipe system is used in the special building we have before us, but in other buildings we have used the two pipe system, and we have taken the flow main, T, down into the basement before it passes out through the building.

I will now describe the special apparatus which makes it possible to heat the water to boiling point, and at the same time to accelerate its motion.

From the steam space of the reheater, B, a steam pipe, D, rises to the attic, where in the circulator, C, it ends in a noiseless mixing apparatus for mixing the steam with hot water passing through the main rising pipe, S. As the circulator is always placed a certain distance below the water level in the expansion tank, E, it follows that no steam will go into the circulator as long as a pressure regulator, regulating the steam pressure in the reheater, B, prevents this pressure from exceeding the water pressure in the circulator "C." Thus you will see that a simple change of the location of the weight on the lever of the steam pressure regulator in the basement gives the attendant means for almost instantly putting the circulator in or out of action, as circumstances may require.

Now if the steam in the reheater is allowed to have sufficient pressure for penetrating into the circulator, C, and mixing itself with the hot water here, the result will be that this water in passing further up through that part of the main piping pipe, S, which connects the circulator with the expansion tank, will have a very strong admixture of steam bubbles, making the specific gravity of this part of the water column in the rising pipe less than half the specific gravity of a column of water at boiling point without admixture of steam.

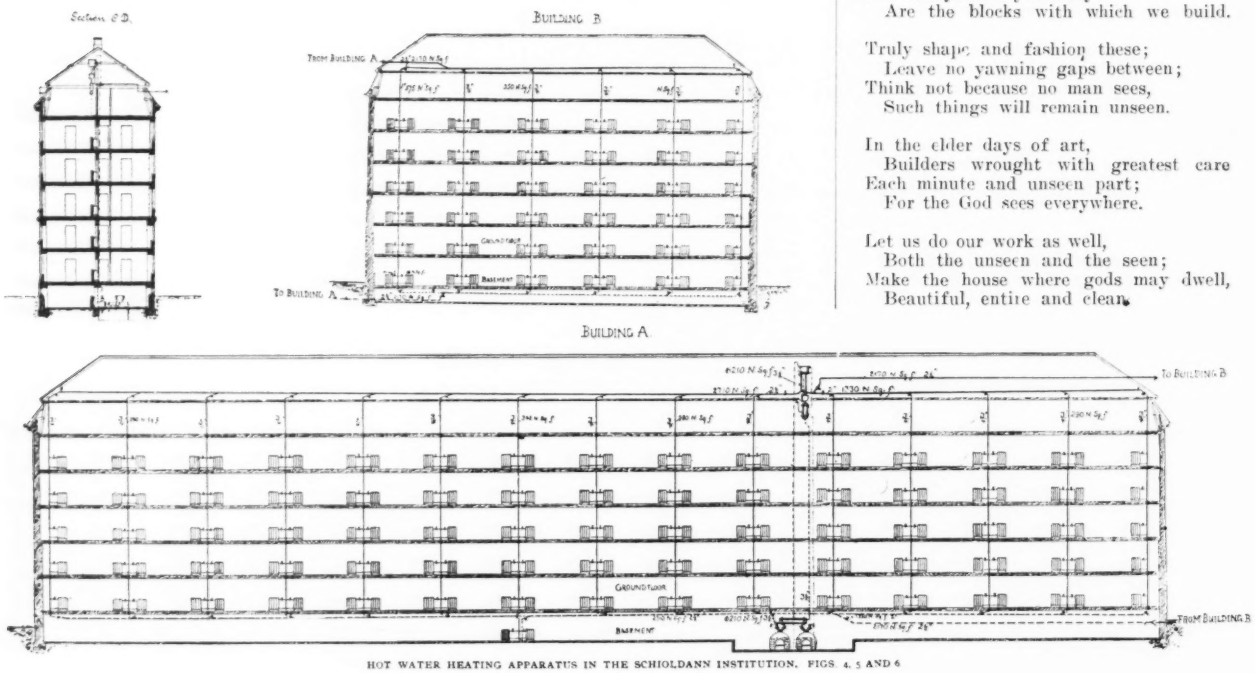


HOT WATER HEATING APPARATUS IN THE SCHIOLDANN INSTITUTION. FIG 1

G. W. Olds, a traveling man who covers all of New England, north of Connecticut, and who gets over his territory about every five weeks, writes me that from his observations and from reports which he receives from all available sources, he believes business at the present time is not nearly so good as it was last year at this time, and what there is is in an unsettled condition. All the trade seems to be buying cautiously and from hand to mouth. The work in sight is not of a large character, and there is but little contract work ahead. A large majority of the plumbing and heating contractors report that the bulk of business done so far is small job work, which does not call for much new material. Labor troubles have produced a morbid condition of affairs in New England, and even those localities where no strikes have occurred are placed a little on edge by troubles elsewhere, and this condition is not likely to be straightened out soon. Mr. Olds does not think that prices are too high to prevent people from building were business on a firm basis. The stiffening of the iron market has affected other lines, but prices are not too high.

WHEN your boot pinches your corn you buy bigger ones, but when you get pinched in a fake ad scheme you just stay sore—queer, ain't it?—*White's Sayings.*

The acceleration of the water in the hot water apparatus, as soon as steam penetrates into the circulator, is due to this great diminution in specific gravity of the uppermost part of the column of rising water. When the water reaches the expansion tank, the steam contained in the bubbles will be discharged from the surface of the water, so that already when descending through the first part of the hot water main, T, the water will be once more perfectly free from steam. The steam discharged from the surface of the water in the expansion tank will reach the condenser, F, through the overflow pipe, M, where it will be condensed and returned thence to the boiler, A, through a special return pipe from the stetam space of the condenser.



HOT WATER HEATING APPARATUS IN THE SCHIOLDANN INSTITUTION. FIGS. 4, 5 AND 6

The condenser, F, consists of a steam jacket or series of tubes inserted on the main rising pipe, S. Its condensing surface must be sufficient to condense the steam discharged from the expansion tank, the volume of this steam always being in a certain proportion to the weight of water passing through the hot water apparatus.

To give an outlet for what air is contained in the upper part of the expansion tank, in the overflow pipe and in the condenser, before steam penetrates the circulator, in ordinary apparatus such as that installed in the Schioldann Institution in Copenhagen, an ordinary automatic air valve is fixed on the condenser, F. If, however, exhaust steam, instead of a low pressure steam boiler is employed for the heating, and if it is desired to relieve the engine of all back pressure, no such automatic air valve is used on the condenser, F, but from this a pipe is run to a pump in the basement, and a valve on this pipe is controlled by a special regulator in such a manner that no more vapor will pass the pipe to the pump than necessary to keep a sufficient vacuum in the condenser and over the water in the expansion tank. The regulator is acted upon by the very suction produced by the circulator, so that it only keeps the valve open when the suction is less than desired. You can find a description of this regulator in a paper read at the October meeting of the British Institution of Heating and Ventilating Engineers by my English licensee, Mr. C. I. Haden, and published in *Domestic Engineering* in December last.

In all cases the attendant can raise the temperature of the water and send it through all the pipes and radiators with greatly augmented velocity by moving the weight on the main steam pressure regulator in the basement. In practice this is done almost every morning, all the year round, and thus a suitable temperature is created in the rooms in a very short time. This time is so much shorter than by ordinary low pressure hot water heating, because the mains and pipes as formerly mentioned only need about one-fourth the sectional areas, so it takes very little heat to get their contents of water up to the desired tem-

The Builders.

All are architects of fate,
  Working in these walls of time;
Some with massive deeds and great,
  Some with ornaments of rhyme.

Nothing useless is, or low;
  Each thing in its place is best;
And what seems but idle show
  Strengthens and supports the rest.

For the structure that we raise,
  Time is with material filled;
Our todays and yesterdays
  Are the blocks with which we build.

Truly shape and fashion these;
  Leave no yawning gaps between;
Think not because no man sees,
  Such things will remain unseen.

In the elder days of art,
  Builders wrought with greatest care
Each minute and unseen part;
  For the God sees everywhere.

Let us do our work as well,
  Both the unseen and the seen;
Make the house where gods may dwell,
  Beautiful, entire and clean.

Else our lives are incomplete,
  Standing in these walls of time,
Broken stairways, where the feet
  Stumble as they seek to climb.

Build today, then, strong and sure,
  With a firm and ample base.
And ascending and secure
  Shall tomorrow find its place.

Thus alone can we attain
  To those turrets, where the eye
Sees the world as one vast plain,
  And one boundless reach of sky.

—Longfellow.

The Irony of Fate.

If you should strive with all your might
To lead mankind to clearer light;
If you evolve some mighty plan
To benefit your fellow man,
And spend your days in earnest toil,
And nightly burn the midnight oil,
The chances are—'tis sad but true—
That no one will take note of you.

But if you venture out some day
When ice and sleet beset your way,
And travel with incautious feet
Adown the treacherous frosted street,
And of a sudden take a bump,
A gruesome, ignominous thump,
Then people laugh—'tis sad but true—
Most every one takes note of you.

—*Washington Evening Star.*

perature. As soon as the building is well heated, the attendant lets the steam pressure drop sufficiently to put the circulator attachment out of action, and runs the apparatus the remainder of the day as an ordinary hot water apparatus, and at such a temperature of the water as is best suited to the outside temperature. Anyone familiar with practical heating knows how much the heating capacity of radiators may be diminished when once the desired temperature is attained in the rooms. I have myself for a long time occupied an office heated by low pressure steam, where I had divided the radiator into three parts, one part 60 per cent., one 25 per cent., and the last part 15 per cent., each part with its own valve. At any time when the difference in temperature between outside and inside was not over half of the maximum difference the heating apparatus was calculated to provide for, it was sufficient to use only the 15 per cent. portion of the radiation as soon as the temperature of the room had been raised to what was required.

The quick and effective central regulation that can be attained by the system described makes it quite unnecessary to divide the radiation in a room into several parts, as has often been found necessary if automatic regulation of temperature in the rooms by thermostats shall be really effective. Such a system of automatic regulation is so desirable that I think any means that tends to diminish its cost, and thus make it easier to get it adopted, will be favorably looked upon.

Before I refer to the plans and sections of the building of the Schioldann Institution accompanying this paper, it will be necessary to explain what is meant by the letter "N" put before all the statements of heating surface carried by the mains and risers.

In a paper read before this society in January, 1900, Mr. James Mackay said about water heaters:

"It would seem quite possible for manufacturers of heating boilers to adopt as standards a certain pressure for steam boilers, and a given temperature for water boilers."

I fully endorse these words, and I think that when, for instance, several American manufacturers put a much higher rating of hot water boilers in such of their catalogues as are destined for England than in those destined for America, such discrepancies may be fully justified by the different customs in the two countries, but I think it will be admitted that it would be desirable if they could be wholly avoided by the adoption of a standard.

It is really the same thing with hot water mains and risers as with boilers. You find in all handbooks rules for determining the sizes of such mains and risers according to the heating surface they have to carry, but as long as no standard is adopted, as to how much heat can be expected to be given off from the heating surface, the value of the rules is very limited, as the number of square feet the same main or

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GEARED SOLID DIE STOCKS

Every Machine Proves It!

BORDEN COMPANY
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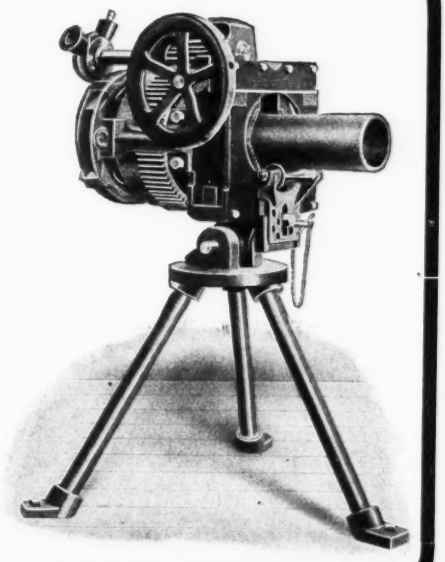

With the Wholesalers.

REPRESENTING SEVERAL MANUFACTURERS.

William McShane, formerly vice president and manager of The Henry McShane Mfg. Co., of Baltimore, represents three or four large manufacturers of plumbing supplies.

TO MAKE PLUMBERS' SUPPLIES.

The Yonkers Plumbing Supply Company, of New York City, has been incorporated with a capital of $20,000 to manufacture machinery and plumbers' supplies. The incorporators are Edward Seiffert, Joseph G. Wellings and Martin D. Fink.

MOORE METAL PROCESS CO. INCORPORATED.

The Moore Metal Process Co., of New York City, has been incorporated under the laws of New York with a capital of $500,000. William H. Harding, Jr., Howard J. Bloomer and Charles H. Hodges, all of No. 11 Broadway, are the incorporators.

ANOTHER NEW FACTORY.

Articles of association have been filed by the Day-Peoples Manufacturing Company, of Detroit, Mich., organized to manufacture and sell tubs, closet combinations, tile flooring, etc. The capital stock is $50,000, held by Eugene R. Day, Alphia C. Peoples and Raney Roberts.

A Notable Master Plumber

JOHN J. SHANLEY, PROVIDENCE, R. I.

President of R. I. State Association of Master Plumbers and of the Providence Local.

RANDOLPH-CLOWES COMPANY INCORPORATED.

Randolph-Clowes Company, of Waterbury, Conn., has been incorporated to manufacture and deal in articles of metal and wood, with a capital stock of $500,000, 5,000 shares at $100 each, all common. The incorporators are Morris B. Beardsley, William B. Boardman and Arthur M. Marsh.

TERRE HAUTE NOW TO GO AHEAD.

W. H. Schott, 1221 Marquette building, Chicago, has completed arrangements by which the installation of the central station heating plant at Terre Haute, Ind., will be begun at once. He has a franchise covering five miles of street. The installation of heating plants for central station connection will average about 50 cents a cubic foot. It will be seen that the installation of such a large system means much work

riser will carry, of course, is wholly in proportion to how much the water is allowed to cool down in the radiators and, therefore, to the heat emitted from them.

If it was customary in America and England to use the British Thermal Unit in calculations of heating apparatus and ratings of boilers; no need of a standard in hot water heating surface would exist. Now, it is well known that such is not the case. The B. T. U. is so small that very high numbers (very often several millions) would have to be used for boilers and mains, and it would be difficult for many able men in the craft to be as familiar with those high numbers as they are now with the numbers of square feet of heating surface. It is to be remembered here, that in low pressure steam heating, where the temperature of the heating surface is always very near 212 degrees F., there can be no objection to the rating of boilers, mains and risers according to the heating surface, so it would be convenient if a similarly uniform method of rating could be used in hot water heating.

Now in the absence of any generally adopted standard of heat emitting hot water surface, and having to give my licensees very definite rules, especially for all mains and risers, I had to choose a standard myself. The standard I have adopted is a square foot of the ordinary pattern of two column cast iron radiator, 38 inches high, heated to a temperature of 160 degrees F., and placed as direct radiation in a room where the temperature is 68 degrees F. I have found that a square foot of heating surface under those circumstances will emit very nearly 160 B. T. U., or about 40 calories in the metric system. I have called this standard a "Nominal" square foot of heating surface, and, accordingly, on plans and diagrams, I always put an "N" before the number of square feet, when I do not mean actual surface.

There are more than one advantage in this standard. First, it is so low that even in England, where, I think, it is customary to use lower temperatures in hot water heating than in America, boiler manufacturers would not need to reduce the surface which they now specify in their catalogues their boilers will carry.

Secondly, there is only one round number to remember, the temperature of the radiator and the number of B. T. U. emitted being 160 each.

Thirdly, the number of metric calories for the standard being 40, this is a round number also, so that, for instance, it is easy to choose a boiler from a catalogue where the capacities of the boilers are given in calories.

As long as American and English heating engineers have not agreed upon certain standard of hot water heating surface, some of you might find it convenient in your office work to use the "Nominal" square foot as a standard. For the convenience of those, this paper is accompanied by a diagram (Plate 2) from which you will be able to see, on the vertical left-hand side, the proportion of heating surfaces of different kinds and temperatures to the standard "Nominal" surface. You will find the mean temperature of the radiators in Fahrenheit degrees along the bottom of the diagram, and you will see that the number "1" on the left-hand vertical side corresponds on curve "I" to a mean temperature of 160 degrees.

The horizontal distances between each 10 degrees F. at the bottom of this diagram are in inverse proportion to the heat emitted per square foot by the radiators. For instance, the distance between 130 and 120 degrees is double the distance between 170 and 160 degrees, because between 130 and 120 degrees a radiator will only emit half the heat that is emitted between 170 and 160 degrees. I have made the divisions in this new manner on the diagram, because it is thus possible at once to find the real mean temperature and the real heat emitting capacity of a radiator as soon as you know at what temperature the water comes in at the top, and at what temperature it leaves the radiator at the bottom. For instance, if you know that the water in a radiator of the type represented by curve "I" will go into the radiator at a temperature of 170 degrees, and leave it at a temperature of 120 degrees, then, as the number 140 degrees is found about in the middle, between 170 and 120 degrees, the mean temperature of the radiator will be about 140 degrees, and its heat emitting power will be about 0.73 of a "Nominal" square foot, because this number on the left-hand side corresponds to 140 at the bottom. If the horizontal line had been divided into equal distances for each ten degrees, of course you would have found 145 degrees as the mean between 170 and 120 degrees, but if then you had taken 0.80 of a Nominal square foot (on the left side) as the heat emitting power of the radiator, you would have overrated it. The real mean temperature and the use of a large quantity of material.

Plumbing Supply Company Building a Warehouse.

The Griffith Heating & Plumbing Supply Company, of Spokane, Wash., are planning to build a two-story brick warehouse at the southeast corner of Jefferson street and the Northern Pacific right of way. The building will be used for storage purposes.

Receivers Appointed for Heating Company.

The Union Trust Company, of Indianapolis, Ind., was appointed receiver for the Home Heating and Lighting Company in that city on Saturday, April 30, on complaint of Knight & Jillson Company, which firm claims the company owes it $24,000.

Open Pittsburg Office.

The Abendroth & Root Manufacturing Company, Newburgh, N. Y., have opened a branch office in room 717, Fitzsimmons building, Pittsburg, Pa., with Edward S. Grace, as manager. Mr. Grace has been their Chicago representative for several years, and in his new capacity will cover Western Pennsylvania.

Still Another Mammoth Plant.

Detroit already has one of the largest plants for the manufacture of seamless tubes, and another of less capacity. The latter finds its orders outrunning its ability to fill, and is preparing to erect a plant which will compare favorably with the best in the United States. The Seamless Tube Co. is officered by Wm. C. McMillan, president; T. H. Simpson, vice president; George M. Black, secretary and treasurer; R. H. Phillips, assistant secretary, and C. H. Wood, manager.

Are Now in New Plant.

The Borden Company, of Warren, Ohio, have moved into their plant, which was recently purchased of the Packard Electric Company. The plant consists of three modernly constructed factory buildings, 200x90, 90x90 and 30x80. They have already doubled their capacity and are now making arrangements to equip their plant with a line of pattern making tools. The Borden Company recently shipped a line of their machinery to the World's Fair at St. Louis and are inviting their friends to visit them during the summer at Block 12, Aisle 2, Machinery Hall.

Standard Sanitary Manufacturing Company to Take New Location.

The eastern office of the Standard Sanitary Manufacturing Company, of Pittsburg, will be removed to 35 West Thirty-first street, New York City, some time between June 15 and July 1 next. The company has recently leased the building at that place and will equip a fine show room, showing a complete line of their products, on the street floor. Their offices will be located in the rear of the show room. They will also use the basement, but will retain their warehouse at West Thirty-eighth street and Eleventh avenue.

Trade Outlook in New York City.

Howard W. Walton, of John Simmons Company, of New York City, a close observer of trade conditions, writes me that the outlook for new building operations in New York is very bright, and that the absence of labor troubles indicates that the building of a large number of new structures is certain. Mr. Walton has been recently in communication with a number of people who have plans in their offices, and is informed that in the past sixty days the figures sent out from different architectural offices in New York have been enormous, one

of a hot water radiator must generally be somewhat lower than the arithmetical mean between the temperatures of outflow and inflow, because the water must cool the more rapidly the higher its temperature is. To find the exact mean temperature of such a radiator by calculation is a rather onerous task. By my diagram you will find it a very easy matter.

I now ask you, gentlemen, to look at the plans and sections of the Schioldann Institution. From the plans you will see that this institution consists of two buildings, separated by a space from 30 to 50 feet wide. The buildings contain in five floors 100 two-room suites, occupied mostly by aged people, who have secured shelter here for their lifetime. Many of the rooms in the basement are included in the system of central heating. The length of the large building is 300 feet; that of the small building is 115 feet. Both buildings are heated from the same heating chamber, situated in the basement of the large building. In this chamber are placed side by side two low pressure steam boilers, each with 190 square feet of fire surface. In mild weather only one boiler is used. The fuel hoppers of the boilers contain so much coke that the boilers can run eight hours in very cold weather without need of attendance. The steam pressure in the boilers never exceeds five pounds. The cubical contents of the rooms heated from the two boilers are nearly 300,000 feet. Vent flues extract the vitiated air from the rooms. The windows are large and the front of the large building is much exposed to the wind. A temperature of 68 degrees F. can be maintained in the rooms at an outside temperature of 4 degrees below zero F. Radiators, partly sectional cast iron and partly wrought iron pipe coils, are placed in the rooms, with a total heating capacity equal to 6,210 "Nominal" square feet, equal to about one million B. T. U. All the surface is carried by a 3½ inch main pipe rising from the reheater over the boiler to the circulator and the expansion tank in the attic in the large building. From the expansion tanks the hot water is distributed by two 2½ inch and one 2 inch horizontal mains in the attics. The main that heats the small building is carried by an iron beam across the open space between the buildings. This main is provided with extra thick covering, and well protected against rain and snow. The radiators are connected to the risers on the one pipe system. Each riser carries 10 to 12 radiators. Most of the risers are ¾ inch diameter, and carry a little over three hundred "Nominal" square feet (about 50,000 B. T. U.) each. The main return pipes in the large building are placed under the ceiling in the basement; in the small building, in a sub-basement. They have the same diameters as the main flow pipes.

The apparatus operates in such a way that, even if the fire has been kept very low during the night, in the morning it is possible for the attendant to get the radiators up to a mean temperature of about 180 degrees in less than an hour in ordinary winter weather. This temperature is kept only until the rooms are well heated. This generally takes but a few hours. After that time, the pressure regulators of the boilers are set to close the drafts at about one pound pressure; then the action of the circulator ceases, and the apparatus keeps a sufficient heat in the building with a very low temperature of the water.

In mild weather it takes more than four days to burn one ton of coke in the heating apparatus. The consumption of coke during a whole winter is about 150 tons, this being about half a ton for each 1,000 cubic feet of space, or a little less than two and one-half tons for each 100 square feet of "Nominal" heating surface in the building. In other buildings heated by the same system, but less exposed than these, the consumption of fuel has been still lower.

Before concluding, I wish to make a remark: It would not have been possible for me, as a contractor, to develop this system of central heating, so that we are now prepared to undertake to heat at very long distances without using mechanical means, if it had not been for one thing. Some of the best Danish consulting engineers (including those engaged by the State and municipal corporations) very often allow contractors to tender for the work according to their own plans and on their own responsibility. Even if the engineers have themselves worked out detailed plans for the work to be executed, they are sufficiently open minded to recommend the adoption of plans proposed by contractors, if they can see any advantage in it for their employes.

I do not doubt that the rapid progress in methods of central heating here in America is largely due to a frequent use of the same manner of procedure by consulting engineers of this country. I think it gives a stimulus to the self-activity of the contractors that is highly beneficial to the profession at large.

person alone saying he had figured on five million dollars' worth of work. If the trade is successful in staving off strikes the building season in Greater New York should foot up to a very large total. Mr. Walton reports that the business of the firm with which he is connected is very good and the outlook very bright.

American Radiator's St. Louis Exposition Exhibit.

The American Radiator Company has arranged to exhibit its products in a very unique and a very interesting manner at the World's Fair in St. Louis.

The exhibit is located just north of the "Open Court" of the Manufacturers' Building, Section No. 6-B, and is in the form of a complete Colonial residence, with the front removed to show the interior and the general application of a modern hot water warming outfit to an average American house.

The interior equipment and furnishings are very artistic, with the colonial spirit as the dominant architecural feature and it is furnished with suitable furniture and hangings. Handsome rugs are laid upon the finished and polished floors. The exhibit is lighted throughout by electricity with handsome side wall fixtures.

A hot water boiler is set up in the basement, connected by regular approved methods of piping to a practical display of radiators located at the best points to illustrate their fitness to regular and irregular situations.

A very notable feature of the exhibit is the feature of brush decoration of the radiators, in demonstration of the fact that this important equipment of the home can be so decorated as to harmonize perfectly with the color scheme of any room and to assist in its proper ornamentation.

The rooms include a living room, with a brick fireplace, book case and window seat. This room shows the application of a low radiator under the window seat and an indirect radiator under the floor with an air register over the same.

A conservatory opening off of the living room and connected thereto by French windows, is fitted with Colonial side wall radiators to show the value of condensed heating surfaces which require no floor space.

The hall is equipped with a stair-case having white spindles, mahogany hand rails and treads. A neat adjustment of Colonial wall radiators in the stair-case form are exhibited here.

The dining room has a seven-foot wainscoating of Flemish oak, a beam ceiling, old fashioned side-board with diamond pane windows over the board. The direct radiator will be placed in this room.

The bed room on second floor is finished in a dainty white trim and handsomely decorated. The rooms are ostensibly lighted by casement windows, which have old fashioned flower boxes on the outside. Direct radiators suitable for these rooms are located therein.

The exhibit shows a finely equipped model bath room with most modern plumbing appliances and a type of American radiator particularly suitable to the contracted spaces available for heating surface in the average room of that kind.

The floor space around the building exhibit (which occupies a space of 16x50 ft.), —the "front yard" of the plot, is handsomely carpeted in green, and a fine detached display is made here of highly finished types of radiators and various types of boilers for steam, for water, for hard coal, soft coal, coke, etc., in rectangular and round sectional forms.

It is believed that this exhibit will accomplish much in showing up to house

The Battery System of Warm-Air Heating.

Paper read at the Tenth Annual Meeting of The American Society of Heating and Ventilating Engineers, held in New York in January, by C. E. Oldacre, of Philadelphia, Pa., Member of the Society.

(CONCLUDED)

There are 16 collars or outlets on the heater top for the connection of the heat pipes. Nearly all of the pipes are connected to separate rooms. The collars are made flaring; that is, the bottom of the collar connecting to the top of heater is made 2 inches larger in diameter than the top of the collar to which the pipe is attached. The purpose of this is to afford an easy flow to the air and prevent too great friction at this point, as would be the case with a perfectly square or right-angled connection.

All of the flues in the partitions and walls, made of the same material as the heat pipes in the cellar, are covered with asbestos sheathing paper; those in partitions with two thicknesses and those in outside wall have two thicknesses around the pipes, and then there are four thicknesses of the same material between the pipe and the wall in addition.

Table I.

	Cubic feet Contents.	Square feet wall sur. (net).	Square feet glass surface.	Sq. feet equiv-glass surface.	Area heat pipe sq. in.	Proportion of heat pipe area to space heated sq.in. cu.ft.	Proportion of heat pipe area to equivalent glass sur. sq.in. sq.ft.
Living room .....19′ x20′ x10′	4,220	378	102	197	126	1 to 33	1 to 1.56
Dining room .....15′ x20′ x10′	3,000	216	84	146	78	1 to 38	1 to 1.87
Main hall—							
First floor .....12′ x24′ x10′	2,880	306	114	190	113	1 to 55	1 to 1.84
Second floor ..... 8′ x24′ x 9′	1,728	72	...	18	...	.....	.....
Third floor	1,664	...	...	...	...	.....	.....
Servants' hall .....11′ x13′ x10′	1,430	44	36	57	38	1 to 38	1 to 1.5
Chamber A .....11′6″x15′ x 9′	1,557	240	30	90	42	1 to 37	1 to 2.14
Front bath ..... 7′ x15′ x 9′	945	40	24	34	21	1 to 45	1 to 1.6
Chamber B .....19′6″x12′6″x 9′	2,574	368	62	159	63	1 to 41	1 to 2.5
Chamber C .....16′ x12′6″x 9′	1,800	234	72	130	50	1 to 36	1 to 2.6
Sewing room .....12′ x14′ x 9′	1,512	56	25	39	50	1 to 30	1 to .78
Rear bath ..... 6′6″x 6′6″x 9′	378	53	10	23	20	1 to 19	1 to 1.15
Maids' room F..... 9′6″x13′ x 9′	1,116	200	25	75	63	1 to 18	1 to 1.2
Maids' room E.....10′ x14′ x 9′	1,260	200	25	75	63	1 to 20	1 to 1.2
Rear hall	1,224	...	...	...	30	1 to 40	.....
Nursery .....16′ x20′ x 8′	3,712	316	60	159*	100	1 to 37	1 to 1.6
Chamber D .....13′6″x13′ x 8′	1,208	30	30	68*	50	1 to 24	1 to 1.36
Guest room .....12′ x12′ x 8′	1,152	64	24	55*	38	1 to 30	1 to 1.45
Bath ..... 6′ x 8′ x 8′	384	36	8	22*	38	1 to 10	1 to .6
Total	33,744	2,853	731	1,537	983		

*There is added at a ratio of 1 to 10 for ceiling of third floor the following E. G. S.: Nursery, 51 square feet; chamber D, 31 square feet; guest room, 15 square feet; bath room, 5 square feet.

Each outlet is supplied with a plain lattice register. Where the depth of the register box is such that a plain-faced register would cut off a part of the area of the flue, a convex-faced register is used.

The total area of all the heat pipes is 983 square inches, which area is distributed among 16 different pipes.

The total area of the space heated is 33,744 cubic feet.

The total wall surface, less the glass surface, is 2853 square feet.

The total glass surface is 731 square feet.

The total equivalent glass surface is 1537 square feet. In this computation, 4 square feet of wall surface are reckoned as equal to 1 square foot of

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owners and property owners the extreme simplicity and sure permanent value of modern methods of steam and water warming. It will prove of great value as an educational feature to the public, in the benefits of which the dealers and contractors in heating apparatus at home and abroad will be liberal sharers. The exhibit is designed in some measure to be a tribute to the highly perfected mechanical skill and workmanship of American heating contractors, whose work has done so much to bring the heating business up to its present noteworthy condition of excellence and popularity.

THE MUELLER EXHIBIT AT ST. LOUIS.

Of all attractions at the World's Fair at St. Louis none should interest plumbers so much as the exhibits of the manufacturers who display goods used in their line. Some of these exhibits are planned upon an elaborate scale, showing thousands of articles and illustrating their uses by practical demonstration. A fair illustration of the scope of some of the larger exhibits is that of the H. Mueller Manufacturing Company, of Decatur, Ill. This firm shows over 3,000 samples, and although most of the pieces are small in size, a freight car of largest capacity was required to transport them from the company's warehouse to the fair.

The Mueller exhibit is located on E street, between Fourth and Fifth streets, Palace of Manufactures, and their booth is one of the most attractive in that building. In the center and at the rear is a pyramid 18 feet high and having a base 20x15 feet. Most of the articles of the exhibit are displayed upon this pyramid, which is arranged in a series of shelves and faced with black velvet and plate glass mirrors.

Surmounting the pyramid is the chief feature of the exhibit, a pressure regulator of mammoth dimensions, designed for regulating the pressure of water in large street mains, or in pipes leading from reservoirs to city mains. This huge casting is 7 feet tall and weighs several tons. On the shelves of the pyramid are pressure regulators of smaller design, lead branch connections for connecting house pipes with street mains; over 20 patterns of corporation cocks, 300 different patterns of gas service, meter and stove cocks; over 150 patterns of stop and stop and waste cocks for controlling water in service pipes; over 250 designs of compression and fuller bibbs for use at water outlets into bath tubs, lavatories, sinks, etc., and various designs of plumbers', gas works and water works tools.

In the foreground is an exhibit of various water and gas appliances in actual operation. Pipes supplied with water at high pressure are used to demonstrate the working principles of water main tapping machines and pressure regulators. With the tapping machine, holes are drilled into the pipe and a corporation cock for making a connection with a smaller pipe is inserted into the hole, the operation being performed without the escape of water. Pipes under air pressure are used to demonstrate the feasibility of making a tap in a gas main with a gas main tapping machine, without the escape of gas. The operating principle of water pressure regulators is demonstrated by attaching a regulator to a small pipe and setting a pressure gauge on either side of it to show the initial high pressure at the inlet and reduced pressure after the water has passed through the valve. In addition to the working exhibit of the tapping machines and pressure regulators, all of the other products in the general display are shown in sectional parts, and the smaller cocks, bibbs, etc., are attached to pipes and shown in operation.

glass surface, and for the third-story rooms, 10 square feet of the ceiling are calculated as having the same cooling effect as 1 square foot of glass surface.

From the above figures it will be seen that there are 34.3 cubic feet of air space for each square inch of area in the heat pipes, or that there is an area of 29 square inches in the heat pipes for each 1000 cubic feet of air space.

There are 1.56 square feet of equivalent glass surface for each square inch area in the heat pipes. There are also approximately 4 square feet of gross exposed wall surface for each square inch area in the heat pipes.

For the purpose of comparison of the various proportions and dimensions, the following tables have been prepared, showing the dimensions of the rooms, the space heated, the wall, glass and equivalent glass surface, the diameter and area of the heat pipes, the size of the registers and proportion of the heat pipes to the space heated and the relation of the heat pipes to the equivalent glass surface (E. G. S.).

It will be noticed that there is a wide variation in the relation of the area of heat pipes to the cubic conten and also to the equivalent glass surface (E. G. S.), but this variation has been occasioned by the conditions and necessities of the case. Exposure, direction of exposure, elevation and length of the heat pipes, the surrroundings of the heat flue, the friction due to bends in the heat flues caused by the building construction, and the relative size of the heat pipes, are factors that were considered in the designing of this plan.

Table II.

2 21 in 692	Dia. A.	Grate Surface.
300	Sq. feet.	Heating Surface.
Cast Iron Indirect Draft		Type of Furnace.
33744	Cubic feet.	Space Heated.
3 Story Stone and Frame Ceilings, 16, 9 and 8		Outside Dimensions and Character of Building.
3584	Sq. feet.	Wall Surface.
731	Sq. feet.	Glass Surface.
1537	Sq. feet.	Equivalent Glass Surface. The E. G. S. equals the glass surface plus one-quarter of the difference between the wall surface and the glass surface.
16 3-7 5-8 5-9 1-10 2-12		Number and Size of Hot Air Pipes.
983	Sq. inches.	Area of Hot Air Pipes.
30 x 35 700		Size and Area of Cold Air Supply.
1-34,3	Sq. in. to cu. ft.	Proportion of Hot Air Pipe Area to Space Heated.
1-1,56	Sq. in. to sq. ft.	Proportion of Hot Air Pipe Area to Equivalent Glass Surface.
1-47	Sq. in. to cu. ft.	Proportion of Grate Area to Space Heated.
1-2,2	Sq. in. to sq. ft.	Proportion of Grate Area to Equivalent Glass Surface.
1-61	Sq. ft. to sq. ft.	Proportion of Grate Area to Heating Surface.
1-112	Sq. ft. to cu. ft.	Proportion of Heating Surface to Space Heated.
1-5	Sq. ft. to sq. ft.	Proportion of Heating Surface to Equivalent Glass Surface.

As an illustration of the distribution of the heat, the following result of an examination of the house, with the plant in operation, may be of interest:

	Temperature of Room.	Temp. of Air at Reg.
Hall	80	180
Living room	80	172
Dining room	79	170
Servants' hall	79	174
Chamber A	76	146
Front bath	79	146
Chamber B	78	180
Chamber C	80	180
Sewing room	80	156
Rear bath	84	150
Maids' room F	76	130
Maids' room E	75	120
Rear hall	80	150
Nursery	83	178 and 142
Chamber D	78	134
Guest room	79	146
Bath	77	145

All on Account of the Plumber.

Frederick R. Mellicke is trying to collect $381 from the city of St. Paul and M. J. O'Neil, a master plumber, says a St. Paul special.

One of the items charged in the account is for whisky to allay the pain of his horse, which fell into a sewer excavation.

Another item is for $7 worth of "high balls" purchased at a Payne avenue saloon to allay the thirst of seven bystanders who helped Mellicke to pull his horse out of the excavation.

Mellicke's story is simple.

He was driving along Payne avenue last Christmas. It was dark and he drove into a sewer excavation being made for the city by O'Neil.

The buggy was broken to pieces and in falling caved in a lot of earth upon the imprisoned horse.

It took six men to help Mellicke get his horse out.

After the animal was out someone suggested "high balls." Several trips to the saloon were made. Then someone suggested that whisky was fine for injured horses. So the horse was given his share of booze.

A Gigantic Pipe Line.

As a means of evading the anti-rebate law and of becoming further independent of the railroads, the Standard Oil Company has planned to lay a pipe line from Texas to New York, with branch lines radiating to the various oil fields. In this way the entire crude oil production of the United States is to be handled. As an adjunct to this enterprise refineries will be erected at convenient intervals, and a fleet of oil steamers is to be operated between Chicago and the eastern ports of the great lakes.

By thus uniting all the oil districts of the country, the Standard Oil Company will be enabled to feed any refinery at will and to develop new fields. Chicago's oil depot, Whiting, Ind., will be made the radiating point of the transportation system. From this point pipe lines will extend to all ports on the lakes. Through the possession of the world's largest refinery, the contemplated extension will make Whiting of much greater importance than it now is. The plant already there will be enlarged, and other plants made subsidiary to it.

Although an outlay of many millions is necessary for this enterprise, it is expected that the results will warrant the expense, as the new method of transportation has been found much cheaper than the old. The diminution of the oil output of the eastern states has also rendered these improvements necessary.

The recent injunction against pumping oil from one state into another has not caused much anxiety to the promoters of the scheme. In order to avoid the anti-trust law the company is separately organized in every state. Legally there is no connection between the Standard Oil Company of Indiana and that of Illinois, but an officer in one of these departments is said to be able to hold the same position in any of the companies in the United States or abroad.

Six thousand miles of underground pipes have been already laid. A large refinery is being built in Kansas City, the equipment for which is now at Whiting ready for shipment. Pipes will be laid connecting Whiting with the oil wells in Indian territory, Texas, Ohio and Kansas, while a network of pipes centering at Lima, O., will connect with eastern stations. From the receiving tanks the oil is forced into the pipes by pumps at a pressure of 600 to 800 pounds. These pumping stations will be located at intervals. The cost of pumping the oil is said to be one-tenth that of shipping it by rail.

Some Old-Time Heating Jobs.

BY GEO. W. HARRIS.

(Read before the Toronto Master Plumbers' Association.)

LOOKING into the early history of heating by steam and hot water we find that in 1837, in England, Mr. Angier M. Perkins (who was a son of Jacob Perkins, an American, formerly of Newburyport, Massachusetts), had invented and was installing several hot water systems of heating, which may be briefly described as follows: A closed tank system which was constructed almost exclusively of three-quarter tubing. The boilers were of the box coil type and were made in one continuous length, there being no fittings other than couplings used in their construction, and all bends were made in the tubes. The radiating surface consisted of similar coils made entirely without fittings and were not provided with valves for regulating the circulation owing to the danger of explosion, for if they were used and closed, pressure would be thus unduly raised by concentrating the heating effect on a lesser surface. Although there was an expansion tank on top of the apparatus it was not usually provided with a safety valve. All the couplings above referred to were made of wrought iron and were tapped right and left; the ends of pipes being then tapered inside and out the screwing up of the couplings brought the tube faces together, thus making a perfectly tight metal joint without packing. After being put up each apparatus was tested to three thousand pounds hydraulic pressure and not deemed safe unless it was found entirely free from leakage under this strain.

It will thus be seen that the only element of safety had was that the radiating surface should be so great in extent as to part with a greater amount than the surface in the fire could absorb from the products of combustion, thus preventing an increase of pressure beyond a limit of safety. To have introduced valves for the purpose of shutting out any portion of the system would therefore have been dangerous and one of the chief objections to the system was that heat in any given room could not be controlled independently of the rest.

We also find that a forced circulation for hot water was used in England a great number of years ago, as the following brief sketch of such a system having been constructed by Messrs. Easton & Anderson in Banstead Lunatic Asylum will show:

The whole hot water service is supplied from boilers placed at one end of the asylum buildings which extend to a distance of several hundred yards. There are two pipes, one of them, which may be called the flow pipe, is connected direct with the boiler, terminating at the point farthest from the boiler in a dead end; the other, which may be termed the return pipe, is parallel to the first and terminates at one end in a cistern which is placed about 6 feet above and supplies the boiler, at the other end farthest from the cistern the second pipe also terminates in a dead end. At each pavilion or place to which hot water is required to be conveyed there is a connection between the two pips which can be closed or opened at will. When it is opened the water can pass from the flow to the return pipe. In the second or return pipe near the point where it ascends to the cistern is placed a rotary pump or fan wheel which is always kept revolving. When the openings are all closed between the two pipes this pump simply slips through the water, but as soon as the return pipe obtains a supply of water from any of the openings between it and the flow pipe, a circulation is established. The adoption of hot water and steam heating on modern lines has been a slow process in England and it was not until a few years ago that any quantity was done at all, but we find at the present time a fair amount being done.

We will now take up a little of the earliest history of hot water and steam heating in the United States.

In 1837 Joseph Nason, then in the employ of the Boston Gas Light Co., invented and patented the "Argand" gas burner and went to England for the purpose of interesting English manufacturers or capitalists to take hold of it, the use of gas being at that time very much more common there than in the United States. Mr. Nason went to London, and after numerous futile efforts to introduce the Argand gas burner, accepted an offer from Mr. Perkins to superintend the construction of hot water systems in London and elsewhere. During the time that Mr. Nason was in England he put up a number both of heating apparatuses and boilers, thereby becoming thoroughly familiar with the system, which impressed him favorably as one which could be used with great advantage in the United States, when people were willing to pay for it, for it was then a somewhat costly luxury.

Books and Catalogues.

"The Age of Specialism" is the title of a neat specialty catalogue just received from the Climax Specialty Company, of Seneca Falls, N. Y. The catalogue is 6x4 inches, nicely bound and contains 144 pages.

Very clever illustrations show the needle spray bath of Dinneen & Cook, 213-217 West 125th street, New York, in operation. They are graphic yet modest, and should suggest to other manufacturers how the nude can be utilized to display plumbing goods without offending good taste.

Catalogue "C" has been issued by Hoffmann & Billings Mfg. Co., of Milwaukee, Wis., and has been greatly needed by the trade. It is of standard size, 10x6¾ inches, made of coated book paper, bound in art canvas, and has 398 pages. It is a very creditable presentation of their product.

The growth of the central heating plant idea has created a demand for a measure of steam supplied under contract. A new device for this purpose is being brought out by the Monash-Younker Company, of New York and Chicago. They have prepared a neat four-page folder describing and illustrating it.

Worn dies and taps and careless work in threading cause screwed joints which are tight, theoretically, to be leaky, practically. This requires the fitter to make them tight by using some material. The reasons why Dixon's graphite pipe joint compound is useful for this purpose are given in a small pamphlet just received from the Joseph Dixon Crucible Company, of Jersey City, N. J.

It's very unsettling to a man who wants to attend strictly to business to get "Wonderland—1904" in his morning's mail. It makes him feel like putting his kit in order and leaving home for an investigation of the scenic, hunting and fishing delights so beautifully set forth. Charles S. Fee, general passenger agent of the Northern Pacific Railway is the guilty party. His address is St. Paul, Minn.

The removal of smoke, noxious fumes and gases; the enforced ventilation of underground rooms; the greater desire for sanitary work rooms; new developments in the trades requiring heating, drying or coaling —all these and many more causes have increased the demand for disc fans. A well printed and illustrated pamphlet on "Disc Ventilating Fans" shows how the American Blower Company, of Detroit, has met the demand. That there are tables showing weights of galvanized pipe per foot, sizes of round and rectangular flues for given air volumes, areas of circles, volumes of air necessary to maintain standards of purity, volumes and densities of air at various temperatures, horse powers of a one-inch belt at various velocities, and properties of saturated steam, is a sure indication that this pamphlet will be preserved by the engineer.

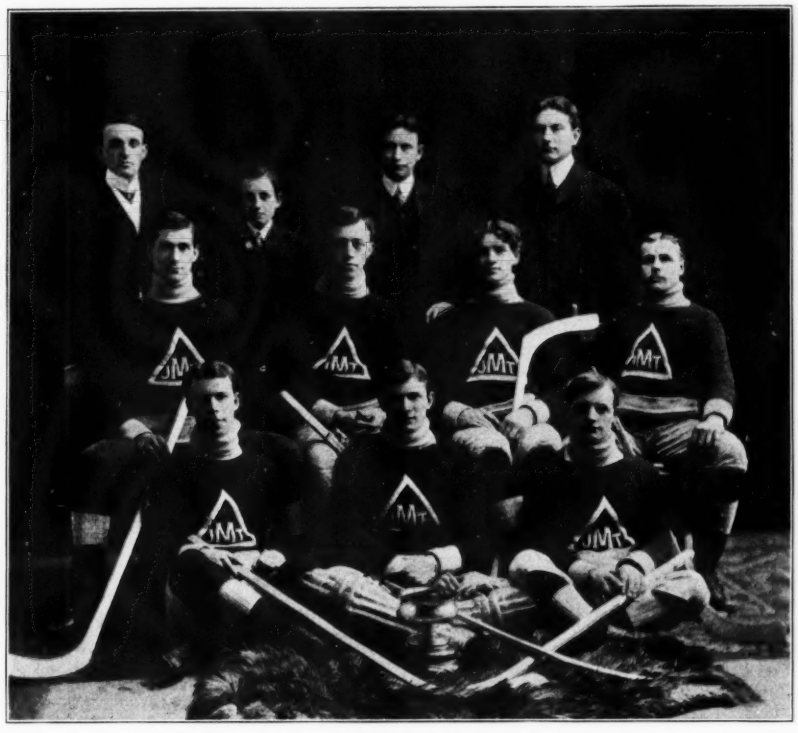
All the good advertising is not confined to the exploitation of the plumbing and heating business. A little pamphlet reaches me personally, entitled "A Model Husband," sent by Chapin & Gore, of Chicago, illustrated and poetized and advertising "Old Reserve."

A water heater and garbage crematory is illustrated in a four-page preliminary leaflet sent us by S. Wilks Mfg. Co., of 35th street and Shields avenue, Chicago. It finds a place in flat buildings where by judicious burning of the garbage an insanitary nuisance is disposed of and made to furnish hot water without expense for fuel.

The first catalogue of the National Pottery Co., of Evansville, Ind., has been handed us by H. F. Weaver, general manager. It shows twenty-eight different types of sani-

There is no question that the store No. 36 Ann street, New York, was the birthplace of the steam heating business in the United States. It was in that store, in 1839, that James Boyce, an Englishman, placed on sale a small stock of butt-welded pipe, two-inch diameter and under, in addition to some other articles which he had brought over from the old country (no pipe being then made in the United States). This stock was bought by Mr. Walworth in June, 1841, after correspondence with Mr. Joseph Nason, who was then in England, with the idea of both dealing in pipe and constructing the Perkins hot water apparatus. Mr. Boyce then left for home, but Mr. Gardner D. Hiscox, his clerk, remained at the New York store for some time. Mr. Walworth carried on the business until 1842, when Mr. Nason returned, and the firm of Walworth & Nason, so well known to the last generation, commenced its active existence. Both Mr. Walworth and Mr. Nason belonged in Boston, and they naturally considered that city a good field for putting in heating apparatus, so they arranged to rent the store No. 18 Devonshire street, built especially for them, and in June, 1842, began business.

James Morrison Brass Mfg. Co.'s (Toronto) Hockey Team.



S. T. Hadley, Manager — Walter Phillips, Mascot — R. A. Morrison, President — J. T. Peacock, Secy-Treas.

W. Hewitt, Cover — W. H. Morrison, Centre — J. E. Crough, Point — H. Turner, Left Wing

F. G. Morrison, Captain. Rover — J. S. Cann, Goal — Harry Granner, Right Wing

In the autumn of 1842 Walworth & Nason put in their first heating apparatus of the Perkins hot water type, at the counting-room of the Chiddlesex Co., of Lowell, Mass. The boiler of this and subsequent apparatus was simply a circular coil of one continuous tube, such as Mr. Baker afterward adopted in his car heater, which is nothing more or less than a Perkins apparatus adapted to a railway car. Although Mr. Perkins' practice was to use no valves, Mr. Nason found that in dwelling house apparatus it was better to divide the radiation into several sections for the various rooms to be warmed. He consequently devised a stop-cock of a peculiar construction, with a stuffing box, not intended to make a perfectly tight-closing of the circulation, but tight enough to reduce it to minimum, so that the temperature of each room could be regulated independently. This arrangement thoroughly effected this, but both Mr. Walworth and Mr. Nason thought it not quite safe to construct an apparatus in which all the surface might be shut off at once, so they decided to discontinue that type of apparatus and place all the heating surface in a chamber or chambers in the basement, with warm air pipes leading to the several rooms, or precisely the indirect apparatus of today.

tary ware; the printing is excellent and the cuts by an ingenious, artistic touch, are very effective. A number of specialties made by the company are not included in this first catalogue. A very good feature is that roughing-in measurements are given for each closet bowl.

Six inches by four and one-half is the odd size of catalogue "B" just sent us by Coyne & Delaney, 303-309 Rodney street, Brooklyn, N. Y. It is bound in red with gold bronze printing, and is from the careful hands of J. D. Abraham & Sons. It shows simply the "C. & D." sanitary controller for stall urinals. The building department of Greater New York has prohibited the use of automatic cisterns and this is intended to be a substitute.

Neatly designed to be mailed in a 6½ envelope, the usual size in commercial use, is the pamphlet "Just a few words with you," sent us by The J. H. McLain Company, of Canton, O. It is "straight talk" about "radiators that radiate." A significant sentence is: "Our management is alert and awake—lives at the factory and sleeps at home." Another significant thing in this little pamphlet is that it speaks of the heating contractor as "the plumber," thus recognizing the fact that only a small percentage of heating jobs using radiators are installed by exclusive steam and hot water fitters.

For the information of the consumer the S. Wilks Mfg. Co., of Chicago, has issued a booklet entitled "Through Fire and Water," intended to tell those in search of the comfort in a home which is brought by hot water, how it may be had, all that is wanted, day or night, in kitchen, laundry or bathroom. It is a well written and well printed pamphlet, showing illustrations of the heaters, but giving no prices. It's another case of the manufacturer co-operating with the plumber and fitter to increase the use of his products. The demand is created among the consumers and the fitter is called upon to supply it.

His Day Off.

He was the boss; was the first to come
When the day began—and he made things hum.
He would bustle 'round with impatient jerks
And instill some life in the lazy clerks.
It was fine to hear how he'd scold and scoff
At the thought that he ought to take a day off.

Why, he'd doubt the clock when it chimed at noon
And he'd-swear that the hour had come too soon.
Go out to eat? Waste that time at lunch?
Not he! He would sit at his desk and munch
And sputter the crumbs when he took a bite
And told the stenographer what to write.

Year in, year out, he was on the go.
He said: "Too busy to rest, you know,"
And the dollars grew to a wondrous pile,
But still he would wear that sarcastic smile
When some one suggested a time for play
Or told of the need of a holiday.

It was yesterday that we met him last—
We were on the street, he was riding past.
And we stopped and looked as we turned to go,
For the wonder was that his pace was slow,
But the rig was new and the horses trim—
It was his day off, for they buried him.

—*Boston Traveller*

Such an apparatus was placed in the house of the late Ebenezer Milliken, No. 15 Ashburton place, Boston, probably in 1845, where it is still in successful operation.

At about this time Mr. Nason conceived the idea of using small pipes of ¾-inch or 1-inch diameter for heating by steam, in place of the large cast iron pipes then in use in England and in a few mills in this country. About March 15, 1845, Walworth & Nason contracted to put into the Eastern Exchange Hotel near the East Boston Ferry, the first steam apparatus in the world, using small wrought iron pipe. On Sept. 11, same year, the apparatus was completed and tested, giving entire satisfaction.

In 1846, at the Boston Custom House, a steam apparatus was constructed which deserved special mention as being the first to use a fan blower in connection with an indirect coil. The apparatus was entirely successful and afforded an ample supply of fresh air and heat. In it the exhaust steam from the engine was used for heating as well as live steam, and was in operation for a period of about 30 years.

During the greater part of the time in these several years, when Mr. Nason was not occupied in superintending the erection of apparatus, he devoted his time to the development of what is now recognized as a standard necessity among steamfitters, viz: the fittings, valves and usual trimmings which are in every-day use. It will be remembered that up to this time all fittings were made of wrought iron and forged by hand. The work was accurate and the fittings were near enough in their inside bore to permit tapping without reaming, but their cost was inordinate. The threads were straight or nearly so. The only means of shutting off portions of circulation were with cocks—the smaller sizes being made of brass and the larger with cast iron bodies and brass plugs, like those of today except that they were usually flanged and of the obsolete pattern to be seen in old English prints.

The angle valve had, it is true, been used; but there was no stop which could be put into a straight line of pipe other than the cock, and the well known globe valve was devised by Mr. Nason as a substitute.

Simple as the device appears today it was at that time regarded as a most ingenious method of accomplishing the same effect as was obtained with a cock—the spherical form of the shell giving throughout the interior an area which was fully equal to that of the connecting pipes.

At this time also patterns were made for cast iron fittings—the largest being 2-inch, for there was no use for anything of greater size; pipe of no larger than 2-inch then being made.

In connection with the fittings and valves, Mr. Nason at the same time devised the taper thread for pipe joints, the pitch being then, as now, three-quarters of an inch to the foot, and the conical form of the pipe entering the taper hole of a fitting insured by its wedge-like action a perfectly tight joint.

Some thirty years ago the direct application of steam heating on a large scale was made at Lockport, New York. About 200 houses in the city are heated from a central supply through about three miles of piping, radiating from a boiler house which contains two boilers 16 feet by 5 feet and one boiler 8 feet by 8 feet. These boilers were fired during the winter to a pressure of 35 pounds with a consumption of four tons of anthracite coal in twenty-four hours. The boiler pressure of 35 pounds in winter and 25 pounds in summer maintained through a total length of three miles of piping up to the several points of consumption where there is a cut-off under the control of the consumers. The first 600 feet of mains from the boilers are 4-inch. There are 1,400 feet of 3-inch, 1,500 feet of 2½-inch and 2,000 feet of 2-inch. The supply pipes from these mains to the houses are 1½-inch and within each house ¾-inch pipes are used.

In addition to the cut-off tap from the main under the control of the consumer, there is a pressure valve regulated to a 5-pound pressure under the control of the company, and beyond this is an ingeniously constructed meter which indicates not only the total consumption in cubic feet of steam, but also the quantity of steam in each apartment. At each 100 feet of main an expansion valve, like an ordinary piston and socket, is inserted, allowing an expansion in each section of 100 feet of 1¾ inches for the heat at 35 pounds pressure.

Little or no condensation occurs in the mains. They are covered with a thin layer of asbestos paper next the iron, then a wrapping of Russian felt and finally manilla paper, and the whole is encased in timber bored out three-fourths of an inch larger than the felt covered pipes, and laid along the street like gas pipes.

The distribution of heat in the apartments is by means of radiators consisting of 1-inch pipes 30 inches long placed vertically either in a circle or as a double row and connected together at top and bottom, with an outlet pipe for the condensed water which escapes at a temperature a little below boiling and is sufficient for all the domestic purposes of the house, or it may be used as accessory heating power for horticultural and other purposes. The laid

Porous Brass Castings.

The cause of leaky castings lies in the metal, and every effort should be made to obtain it as free from oxide as possible, says C. Vickers in a recent number of *The Manufacturer*. To accomplish this, it is recommended to use only ingot copper, and to melt it in the presence of and under charcoal, or other carbonaceous matter, and never allow it to become overheated; also to use some deoxidiser, as, for instance, phosphor tin, in the proportion of ½-lb. per cwt. of metal, and to be very watchful of new heats, the safest plan being to melt the metal twice. When purified metal is used, devices for preventing the dross entering the casting will scarcely be necessary. Dross and other impurities are lighter than the metal, and the idea of the "skim gate" is to dam the metal into a column, into which the dross rises, like a cork in water, and where it will stay, provided the column is held up by the proper pouring. the sound metal from the bottom passing by a suitable channel to the mould. A "whirl gate" consists of a riser and pouring sprue, the channel connecting the two being cut at a tangent to the circumference of the riser, the contents of which are thus given a rotary motion which holds the dross in the center of the vortex; a channel or runner connects riser and sprue, which latter is connected to the riser by a small gate, which permits of the sprue being kept full of metal while pouring; the dross being held back and the riser merely feeding the casting and preventing shrinkage. In conjunction with these various gates, a horn sprue is used in some foundries to carry the metal from riser to mould.

The Common Man.

His not to hear the wild hurrah
  Loud hail his honored name;
His head was never reared to wear
  The laurel wreath of fame.

Not in the records of great deeds
  His mention shall appear;
He simply lived and simply died,
  A leaf that lasts a year.

He rode not on the topmost wave
  Lapped in a diamond cup;
He was an atom of the sea
  That holds the bubble up.

The froth upon the surface rides
  Serenely light and fair;
But ah! the strong tides lie below
  That patient keep it there.

What of the world if this deep tide
  Should sudden pass away?
The best of earth would helpless lie
  Low in the ooze and clay.

The man within the humble cot,
  Of whom no poet sings—
His hand, obscure, unseen, unknown,
  Upholds the thrones of Kings.

For good or bad, his silent will
  Works on while years go by;
Fate speaks from out the lowly home,
  And nations rise or die.

It is the soul that makes men great,
  And not the empty name;
Earth's greatest heroes live not in
  The chronicles of Fame.

Mankind withholds its grudging meed,
  And has since time began;
Yet Truth must crown with laurel wreath
  The obscure Common Man.

—*Lowell O. Reese in San Francisco Bulletin.*

on steam is also used for cooking purposes for boiling and even for baking. As in the case of gas supply the steam supply company lay their pipes up to the houses, the consumer paying for all internal pipes, fittings and radiators. In a moderately-sized 8-roomed house the expense of these amounts to $150, and in larger houses with costlier fittings to $500.

It would be impossible to trace the growth and progress of the heating trade up to the present day with its numerous steam and hot water boilers, radiators, valves, etc., and the numerous systems of steam and hot water heating, increasing as they are in number almost every day. Suffice it to say that we have the radiator patented in the United States in March, 1862, and I am sure it will be pleasant news to the radiator manufacturers of today to know that the trade price for a period of about 10 years was $1.75 per square foot.

It has always been conceded that Montreal was the birthplace of hot water heating in Canada. Beginning about 1855 and for a period of about ten years we find hot water systems being constructed very similar to the Perkins system, as before mentioned. In the year 1864 we find the first cast iron boiler manufactured in Canada by Messrs. Rogers & King, of Montreal, namely, the Beehive, and in that year a hot water system was installed in the Montreal General Hospital, using a Beehive boiler and pipe coils for radiation. Ten years later we find the Spence sectional boiler in use and in another ten years the Champion sectional, and in 1886 the round sectional Daisy boiler, which type of boiler is in general use today. The city of Ottawa claims to have put in the first boiler of this pattern made. Montreal until quite recently has not taken very kindly to steam heating, preferring hot water, even to the extent of heating very large buildings with same, and the reader well remembers the first large one pipe steam job constructed in the Canada Life building by The Bennett & Wright Co., and how the fitters there ridiculed the idea of such a system working satisfactory.

Toronto, on the contrary, has always been favorable to steam heating, and the most reliable information obtainable places the date as 1854 when the first steam heating plant was constructed in the old Rissin House on King street, by Messrs. Thomson & Keith, founders of the present Keith & Fitzsimmons Co. Other firms engaged in the business at that time were Messrs. Cummings & Wells, Mr. Geo. Harding and Mr. John Wright. Three years later, in 1857, we find Mr. John Ritchie established in business, and it may be interesting to note that Mr. Jas. Bennett and Mr. Jas. Wright, who were the founders of the Bennett & Wright Co. in 1875, was, previous to starting in business, employed by Mr. John Ritchie.

In 1876 we see the firm of Morrison & McGuire established on King street, on the site of the present W. J. McGuire & Co.'s premises, and after several years of success Mr. Jas. Morrison retiring to devote his whole time and energy to his present brass manufacturing plant. Among others the following are a few of the principal heating plants constructed by the pioneers in the business: Osgoode Hall, Toronto University, Central Prison and Shaftesbury Hall.

Hot water heating in Toronto apparently commenced about 1860, and if my information be correct was first used for greenhouse heating, being constructed with 4-inch cast iron circulating pipes. This style of heating for greenhouses was favorably thought of and extensively used, in fact up to about ten years ago.

Referring to our own Toronto manufacturers we find The Gurney Co. manufacturing the Crescent cast iron boiler in 1873, the Nason pipe radiator in 1875 and the Bundy hot water and steam radiators in 1878, and in 1881 the Geyser boiler, and in 1891 the present style Oxford boiler.

We are pleased to note that the Gurney Foundry Co., of Toronto, are manufacturers of as extensive a line of heating goods as any manufacturer in Canada.

In the radiator manufacturing we must not forget that in 1884 The Toronto Radiator Co., now the Dominion, commenced the manufacture of cast iron radiators, and we, as Toronto citizens, should feel proud to say that this company's boast of being the largest radiator manufacturers under the British flag, has not yet been questioned.

One of the Old Guard.

For just about fifty years Daniel J. Rock, 118 North Clark street, has followed the shifting fortunes of the plumbing business in the city of Chicago, having learned his trade in this city half a century ago, and yet Mr. Rock is not an old man, being this side of the allotted span of life and exceptionally well preserved for his years. The Man About Town always likes to talk with members of the corporal's guard which still remain of the old time master plumbers, and Mr. Rock is one of the veterans in point of service.

Unlike many men who have lived to witness marked changes in their chosen vocation, Mr. Rock concedes that progress has been for the better, so far as improved sanitary conditions are concerned, but not unnaturally he thinks the "good old times" were better for the rank and file of the plumbing craft. The introduction of machine made plumbing fixtures and appliances has made plumbing a trade easy to learn as compared with the days when the plumber was compelled to make with his own hands everything that went into the job.

The abolition of indentured apprenticeships he considers as the weakest point in the present system of making plumbers. "With nothing to bind him to his employer," said Mr. Rock, "the boy drifts from one employer to another, usually getting employment from the 'jobbing' plumber, who keeps him at repairing leaky faucets and similar work until, at the end of three or four years at the trade, he is recognized as a full-fledged plumber, although really possessing a very limited knowledge of plumbing work, and a smaller knowledge of the proper way to run a plumbing establishment.

"Not being up to the standard of workmanship required by the larger shops he finds it hard to get employment at journeymen's wages and naturally opens a little shop for himself. As a rule he is content if he makes day wages out of a job and being poor at figuring he more often than not fails to do even this.

"So long, however, as he confines himself to overhauling work he is not a dangerous competitor, but very often he gets the idea that he was cut out for something bigger and makes a wild bid on contract work, which everyone who has figured on the job knows ought to land him in the bankruptcy court. But he gets the job and through the leniency of the supply houses he is able to keep his head above water for awhile until the inevitable crash comes.

"We hear a good deal about the children of this generation being educated above their station, but I want to tell you that if more of our boys could be persuaded to stay in school until they have learned all that can be learned short of college we would have fewer business failures. It is because boys break into business before they have either sound judgment or experience to guide them that so many men are unfortunate in business.

"Give me the high school graduate every time, even in the plumbing business. He makes a fairer competitor and as a rule he is a man who takes the greatest pride in his work.

"The trade schools are a great thing for bettering conditions in the trades. We should have more of them—have them in every city. Then we should have a generation of mechanics who would take the same pride and interest in their work as did our forefathers."

What metal makes the most serviceable coin for use in the world?—Brass.

Test of a Hot Air Heating Apparatus using Radiators instead of Registers.

BY GEO. M. AYLSWORTH, M. D., COLLINGWOOD, CANADA.*

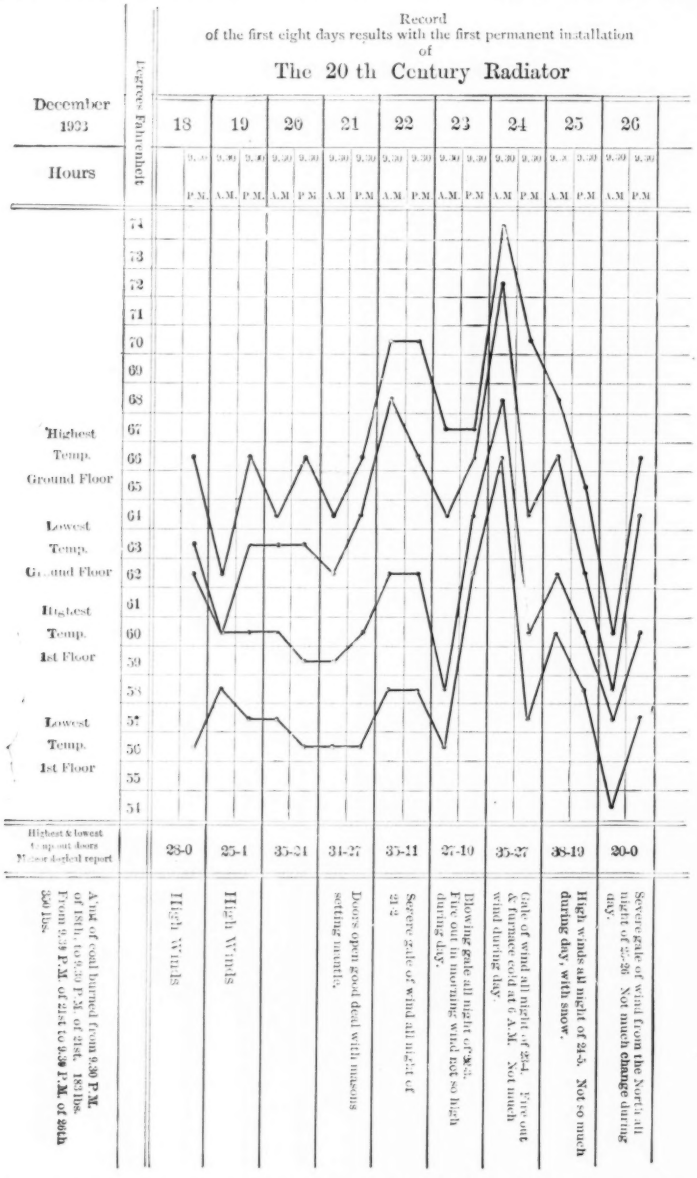
IN accordance with your invitation I submit the results obtained from the first permanent installation of hot-air radiators during the eight days following its completion.

They were obtained in the city of Collingwood, Canada, which is near the latitude of Portland, Me., and it is notorious for high winds.

The building selected stood about three-quarters of a mile from the shore of the southeastern end of Georgian Bay.

Georgian Bay is a body of water from 40 to 90 miles wide and 140 miles long from northwest to southeast, over which come the prevailing winds.

The building is a new two-story isolated and brick-clad dwelling practically unprotected from winds, having ten rooms exclusive of closets and halls. The pipes, supplying heat to the bathroom and a bedroom over the pantries,



pass from basement to the first floor through a lath and plaster partition next the kitchen and pantries. As there was no fire in the house, or means of making any, except the furnace, the kitchen and pantry absorbed most of the heat

*Read by invitation before the American Society of Heating and Ventilating Engineers at their tenth annual meeting in New York.

Our Leading Article.

We are fortunately able to present to the readers of DOMESTIC ENGINEERING this month an article on "Methods of Sewage Disposal," by Prof. W. S. Leavenworth, head of the chemistry department of Olivet College, Olivet, Mich., in this month's number of our publication. Prof. Leavenworth is a thorough student of this branch of sanitary work and is well qualified to speak upon it. He has treated this subject in lecture form upon a number of platforms. His extensive knowledge has been acquired while professor in different colleges of the middle west.

With the Association.

INTERNATIONAL ACETYLENE ASSOCIATION WILL MEET AT ST. LOUIS.

The International Acetylene Association will hold its annual convention at St. Louis, Mo., on September 14, 15 and 16.

AMERICAN FOUNDRYMEN'S ASSOCIATION.

Dr. Richard Moldenke, secretary of the American Foundrymen's Association, announces that the Hotel Claypool, Indianapolis, will be headquarters for the annual convention of the association on June 7, 8 and 9. Twenty papers are promised for the meeting, covering a wide range of subjects.

GEORGIA PLUMBERS TO MEET AT TYBEE.

The Master Plumbers' Association of the State of Georgia will hold its first annual meeting at Tybee, Ga., on June 25 or 28. The association was organized at Macon March 28 of last year and L. A. McCarthy was elected president. At that time it was decided to hold its annual meeting at Tybee.

WILL MEET IN ST. LOUIS.

The twenty-seventh annual meeting of the Western Gas Association in connection with a Gas Congress of all American Gas Associations will be held at the Gas Exhibit Department, of the Louisiana Purchase Exposition, St. Louis, Mo., June 14-18, 1904. The sessions of the Western Association will be held June 14, and will be called to order by the president, Mr. F. H. Shelton, at 10 a. m.

A LITTLE CHANGE IN LOCATION.

Headquarters of the United Association of Journeymen Plumbers, Gas and Steam Fitters and Steam Fitters' Helpers have been removed from the fifth to the fourth floor of the Bush Temple of Music, corner of North Clark street and Chicago avenue and the move is a good one. Large space and plenty of light and air make the offices of the association look very bright and cheerful, a look which is reflected on the countenance of Secretary L. W. Tilden and his assistants.

MAY MEET IN DIXIE.

It is expected that the referendum vote taken by the United Association will, when counted, show a majority in favor of holding a convention this year. In accordance with the plan adopted at Omaha two years ago the Journeymen Plumbers' Association holds an annual convention only as often as it seems expedient to do so and the point of expediency is determined by a popular vote of the entire organization. Polls closed on May 15, but the count had not been completed at the hour of going to press. If held Birmingham, Ala., will be the place of meeting and August 15 the date.

TORONTO

PROVINCIAL PLUMBER APPOINTED.

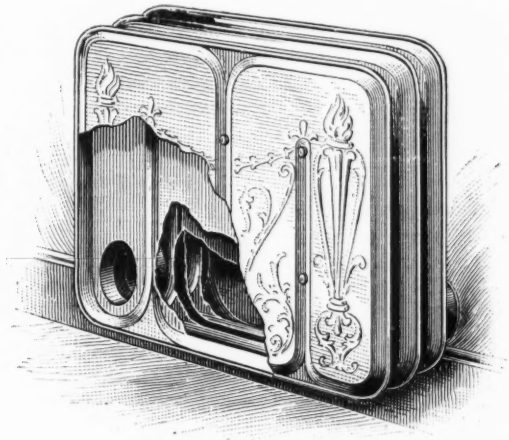
Mr. J. J. Heydon, who for four or five years has been occupying a temporary position under Martin J. Quinn, mechanical superintendent at the parliament buildings, has been placed in charge of all plumbing repairs in the provincial institutions, but will still be under Mr. Quinn.

through the partition that was intended for the bathroom and bedroom mentioned, so that the two latter rooms are not included in the temperature record though the heat was constantly turned upon them.

The furnace has a fire-pot 16 inches in diameter and its capacity with register is estimated at from 7,000 to 12,000 cu. ft. by its manufacturers. The space heated in this test is 13,400 cu. ft. (ground floor 6,450 cu. ft.; first floor 6,950 cu. ft.). The outside doors and windows have 415 sq. ft., of which 56 are in the kitchen and pantries, leaving 359 sq. ft. The outside walls have 2,720 sq. ft., of which 480 are around the kitchen and pantries, leaving 2,240 sq. ft.

From these data Professor Carpenter, of Cornell University, would estimate the radiating surface needed for hot water at 508 sq. ft. Another authority gives 448 sq. ft., which would be an average of 478 sq. ft.

On this test of hot-air radiators there were used 350 sq. ft. of radiation, or 37 per cent less than the average estimate of these authorities for hot water.



View of Radiator.

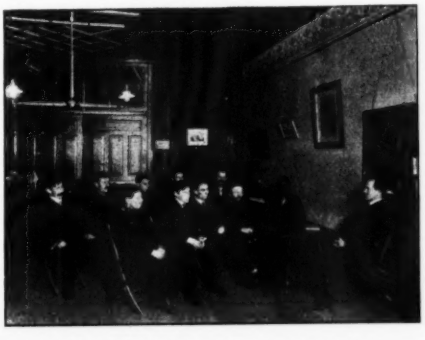
The temperature indoors and the consumption of coal was taken by the writer for the first three days and by a janitor of experience, but with no knowledge of the furnace used, for the rest of the time.

The temperatures outdoors were obtained from the provincial officer in charge of the meteorological station at Collingwood. In the night of the 27-8, as the test closed on the 26th at 9:30 p. m., the temperature reached —15 with a gale of wind. At 9:30 a. m. of the 28th, with an outdoor temperature of —12, notwithstanding the orders giving the janitor not to crowd the furnace on any account after the 26th, the ground floor temperatures were: Highest, 60 degrees; lowest, 58 degrees. The first floor: Highest, 57 degrees; lowest, 54 degrees. This item is added because —15 is the lowest temperature registered for many years at Collingwood.

The chart gives results for eight days, from 9:30 p. m. of the 18th to 9:30 p. m. of the 26th.

ENJOY RARE OPPORTUNITIES.

The accompanying half-tone shows the class in heating and ventilating, conducted under the auspices of the Ann Arbor (Mich.) Young Men's Christian Association.



Heating and Ventilation Class, Ann Arbor.

With one exception the pupils are members of labor unions; tinners and plumbers. One comes from an adjoining town eight miles distant, another sixteen miles on the electric car, each week to attend the class. A recent class hour was spent in inspecting the heating plant and fan system of ventilation in use at the University. Professor Allen, of the Engineering Department of the University, is the instructor of the class. Professor Allen also teaches a class in engineering at the Detroit City Association one night a week.

The National Convention.

The Master Plumbers' Association is making preparations for the reception of the visitors to the National Plumbers' Convention to be held in this city on July 20-22. Messrs. Wm. Mansell, Kenneth Allison and Secretary Meredith appeared before the Reception Committee of the City Council last week and secured a grant of $75, which will be used to pay for carriages to convey the Master Plumbers to points of interest in the city. Mayor Urquhart will welcome the visitors and confer on them the freedom of the city.

Windsor Plumbers Settle.

An agreement has been reached between the master and journeymen plumbers through the mediation of Mayor Drake and both parties have signed the scale. The settlement is a compromise, both sides making concessions, the chief difficulty having been to get either party to take the first step. The terms upon which the agreement was reached are: Nine hours will constitute a day's work. First class men are to be paid 35 cents per hour as the minimum rate and second class men 30 cents as a minimum. Disputes as to classification are to be settled by a joint committee. Work done between 6 p. m. and midnight to be time and a half and from midnight to 7 a. m. and on Sundays and holidays to be double time.

MONTREAL

The Situation in Montreal—Plumbers Strike.

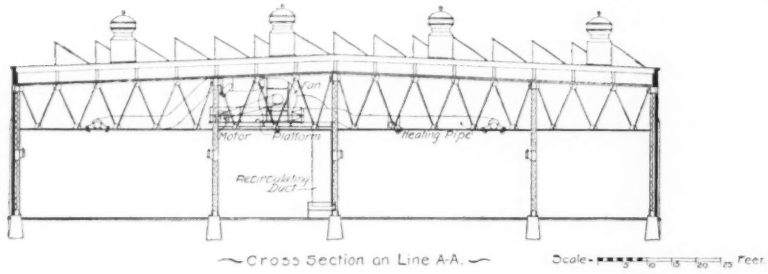
Montreal has at last been visited by what has so long been termed an unknown quantity in this section of the Dominion, permanent sunshiny days; and as a consequence trade which for some time past was dormant, is rapidly reviving and the management of a number of the supply houses, salesmen, and tradesmen are wearing sunny smiling faces, owing to the fact that orders are commencing to make the local staffs busy, owing to the impetus in building operations. Four hundred thousand dollars building permits were issued for the month of April and several large orders have been placed with local agencies, for steel, iron and plumbing materials.

While Montreal has every prospect of a successful and prosperous season, yet owing to the threatened labor troubles in the building trades section of organized labor, it is to be feared that trade may receive a setback unless wiser and cooler counsels prevail and amicable settlement be effected.

The Plumbers', Gas and Steam Fitters' union, including the helpers, went on strike Monday, May 2, owing to the refusal of the members of the Masters' Association of the respective trades to concede the demands made, or to recognize the union. These demands included abolition of the open shop, recognition of the union, establishment of an eight-hour day, the right of the union business agent to visit the shops or jobs where union men were employed, limitation of number of apprentices. The masters have thrown down the gauntlet and aboslutely refuse to recognize the union in any manner whatsoever, and declare their intention in future to run open shops, and also to treat with their employees individually. But the sad aspect of the position is, that just as Montreal was recovering from the effects of the past Arctic winter, and employment was promising to be good, and trade reviving, these unfortunate labor difficulties threaten to cause capitalists to hesitate in venturing their money in building enterprises and thus cause stagnation just at the period when prosperity is most needed.

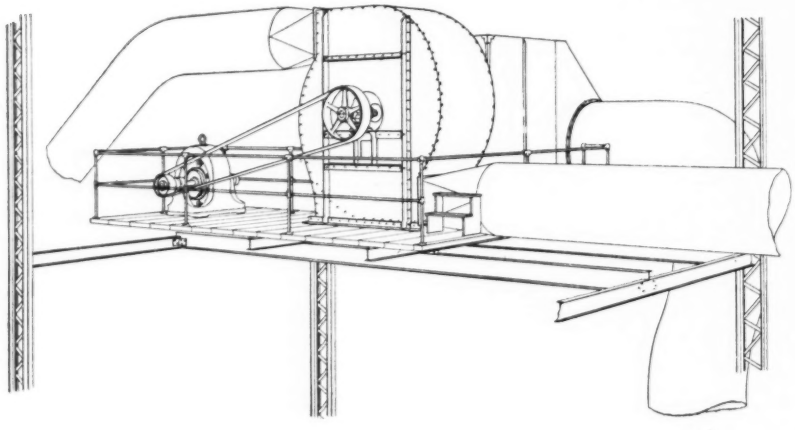
A UNIQUE OVERHEAD HEATING SYSYEM.

The accompanying plan illustrates a novel heating system which the American Blower Company, of Detroit, Mich., are at present installing in the new shops of the Olds Gasoline Engine Works at Lansing, Mich. The excellence of the lay-out submitted to the engineers of the buildings, Field, Hinchman & Smith, of Detroit, securing the contract. This construction leaves the floor space absolutely clear.



The building is one story in height, being a steel frame structure. It consists of one division running east and west 130x438 feet; one division running north and south 62x346 feet; one locker, office and wash room building 36x141 feet, and one paint storage building 20x20 feet.

The heating apparatus is arranged to provide for an additional 130x438 feet to the main portion of this building, and to maintain an average temperature of 65 degrees Fahrenheit throughout the present structure, with the exception of the offices and paint shop, which are to be heated to 70 degrees. This apparatus consists of four units, each made up of a sectional base heater,



Perspective of Apparatus in Roof Trusses.

having a capacity of 3,250 lineal feet of one inch pipe, to which is attached a full housed steel plate fan. The fan, located in the 62-foot wing, is special, having a housing 100 inches high and a wheel 66 inches in diameter. The other three fans are regular 120-inch fans, with wheels 72 inches in diameter. All of the fans are operated by independent motors.

All of this heating apparatus is carried on girders which span the roof trusses in the wings, and is entirely above the bottom chords of same.

OVERCOMES DIFFICULTY BY FORCED CIRCULATION.

To overcome the difficulty presented by the fact that there are no basements in the City of Mexico, and it is therefore necessary to install heating boilers on practically the same level as first floor radiators which they supply, John W. Johnson, a Chicago journeyman steamfitter, has designed the system shown in the accompanying sketch. The system provides for the forced circulation of hot water by means of two Youman pumps, run by electricity.

The heating plant for which the system was designed by Johnson will have five thousand feet of radiation, and hot water was specified as being most suitable for the climate of Mexico City, where heat is required only in the morning and the evening. Since surface water is struck at a depth of from

SAN FRANCISCO

Two at a Time.

J. Looney has just received two nice contracts, one from George T. Cavilli for the plumbing of a building at Union and Polk streets and the other from E. A. Downing for similar work at O'Farrell and Laguna streets. The two jobs together are valued at over $3,000.

Seattle Branch Moved.

The George H. Tay Company, of San Francisco, has announced that its Seattle branch is now occupying its new store and warehouse at First avenue and Railroad way, where, as before, a complete line of this firm's supplies will be carried. The move was brought about by the increased facilities and unusual shipping advantages which the new location offered.

A Good Job.

Gulick & Wetherbee have been awarded the contract for the plumbing, gas fitting, sewering, hot water service and the piping for the same in a five-story building being erected on Sutter street, near Jones, by I. Schwartz and S. Disbecker. The contract price is $10,530.

This same firm is to do the rough and finished plumbing in the Security Savings bank on Montgomery street, near California.

A Few Others.

James F. Noonan is to do the sewering, gasfitting and plumbing for Catherine Felvey in six flats on Bryan street for $1,400.

George F. Bernard has contracted to install the plumbing system in a building on Eddy street for Emma Ehrenpfort for $1,125.

Kern Bros. are to do a lot of work, including plumbing, for Goldberg, Bowen & Co. in a three-story brick building on California street.

Offices Removed.

The Globe Engineering Company, which for several years has been located at 146 Second street, is to move to 115 New Montgomery street. Here large and well lighted quarters have been secured and the firm need not suffer from the lack of room as before. The Globe Engineering Company has risen rapidly into prominence in the local heating and ventilating field and many large contracts have been secured by it.

Recent Contracts.

G. C. Sweeney has received a $1,000 contract from Daniel Wilson for the plumbing of a building on Washington street, near Leavenworth.

J. Looney is to do the plumbing work in four flats being erected by Chas. M. Johnson, at Central avenue and Fulton street. The cost is to be $950.

Shepard Bros. have a good sized contract with Theodore Dierks for the plumbing, sewering and gas-fitting of a building on Golden Gate avenue, near Larkin street, the contract price being about $4,000.

CALIFORNIA

New Store to Open.

Robert Moorhead is to open a modern plumbing establishment on Palm avenue, Dolgeville.

To Lengthen Pipe Line.

At the Auriferous mine in Grass Valley, 300 additional feet of pipe line is being constructed.

New Plumbing House.

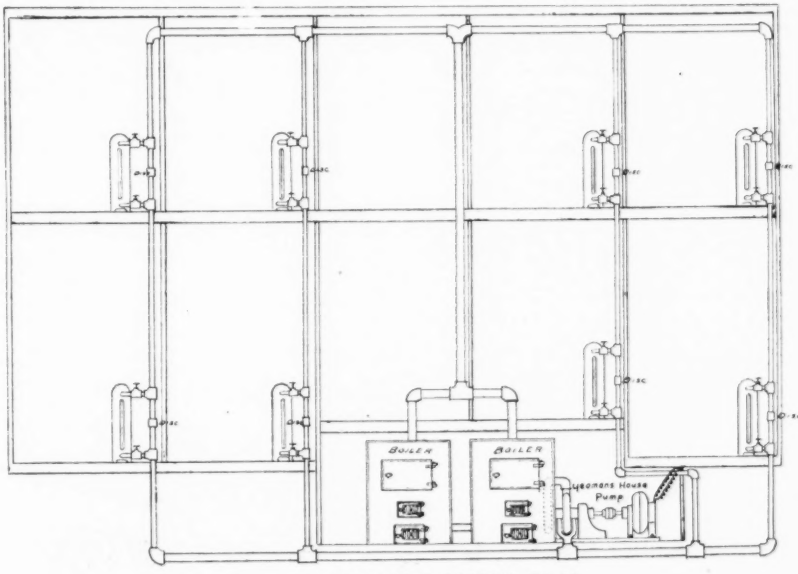
Hugo Miller and Jack Connolly have opened a plumbing establishment on the corner of Fourth and Center streets, Yreka, Cal.

Postoffice Contract Let.

The contract has been let for the new postoffice building to be erected at Bakers-

18 to 20 inches, the boilers cannot be pitted more than a foot, hence the overhead system for hot water is the only practicable one.

Mr. Johnson had charge of a big heating job in Mexico about a year ago and naturally acquired a working knowledge of the language, and his experience with peon labor will stand him in good stead on future work. A peon has to be understood thoroughly before a fair day's labor can be exacted from him. He will have nothing to do whatever with any device that has a tendency to lessen labor. The old fashioned methods in vogue centuries ago are still



HOT WATER SYSTEM TO BE INSTALLED IN CITY OF MEXICO, MEX.

adhered to. For instance: A small stockily built peon will back up to a wagon, adjust a strap across his forehead, the other end being fastened to a 12-loop radiator, crook his back about 40 degrees and start off with this enormous weight with as much unconcern as a Chicago steamfitter displays in carrying an ordinary chain tongs. It is also a common sight, according to Mr. Johnson, to see a peon with a piano strapped upon his back traveling as lightly as a hod carrier with a hod of mortar in our country.

WHAT ASBESTOS REALLY IS.

In the important work of protecting life and property from fire, there is a growing appreciation of the value of asbestos, and a constant increase in its use. It has a combination of properties unlike that of any other substance found in nature. No other product as yet discovered could take its place. It has been called mineral wool, and, also, the connecting link between the mineral and the vegetable kingdoms. After the fibers of asbestos have been separated from their mother rock they have a fluffy softness and whiteness much like that of wool or cotton, and by a process very similar to that of ordinary weaving they are converted into cloth. It is a cloth, however, which, owing to its mineral origin, is impervious to fire, and herein lies its value. It is more and more extensively used in this country for fireproof theater curtains, for firemen's helmets, jackets and leggings, and for gloves and shields for men working at the mouths of furnaces. The texture of the fabric resembles that of canvas, so it is too coarse, as now manufactured, for such delicate materials as those of lace curtains and women's dresses, for which its use has been suggested, but an interesting way in which it is now utilized is in the work of surgeons in making splints and dressing wounds. Cotton and wool must be specially treated to be rendered absolutely clean and antiseptic, while asbestos is naturally so. The greatest drawback to its widespread utilization, at present, is the cost of the fabric. The standard price of the cloth is three dollars a yard. When made into a fireman's jacket and leggings, the latter cost about fifty dollars. While asbestos-bearing rock is found extensively throughout the world, most of that which yields the fibers used in manufactures on this hemisphere is mined in Canada, about seventy-five miles from Quebec.

field to C. J. Lindgren on his bid of $25,531. This contract includes plumbing, heating, etc.

DECIDES AGAINST INSPECTOR.

Judge Hall, of Oakland, has rendered a decision in the suit brought against L. T. Hawe, plumbing inspector of Berkeley, by a local plumber. The decision holds that the inspector can not legally inspect his own work nor collect fees for doing so.

WILL OPEN SHOP.

C. G. Witman and son have arrived in Imperial, where they are making arrangements to open a plumbing establishment. Messrs. Witman will erect a building in the central part of town and will carry a complete stock of plumbing goods, tinware, stoves, etc.

PLUMBING ESTABLISHMENT SELLS OUT.

The Whittier Plumbing Company, of Whittier, conducted by Page Bros., has been sold out. Henry M. Page of the firm has invested some $10,000 in real estate in Whittier and intends to remain in that place. Harley M. Page will assume charge of the plumbing department of the Whittier Hardware Company.

OREGON

NEW BRICK BUILDING.

Plans and specifications have been prepared for the construction of a four-story brick building in Portland for Dr. E. H. Parker. The structure will cost $30,000.

NEW CITY HALL IN PROSPECT.

A site has been selected at La Grande for the construction of a new city hall building, to cost $25,000. The structure will be provided with all the latest appliances in plumbing and heating.

WILL HAVE TEST CASE.

A test case is being made of the arrest of H. Claussenius, Jr., who was working without a license. The attorney for the defendant in his argument last week brought out the fact that it is illegal to plumb in the city of Portland, owing to the peculiar working of the penalty clause.

WASHINGTON

TO INSTALL FILTERING PLANT.

A special election will be held in Colfax immediately to incur a bonded indebtedness, the proceeds to be used in the construction of a filtering plant.

PLUMBERS ARRESTED.

Plumbing Inspector Allen has sworn out warrants for the arrest of J. Bartholomew and R. Fassett, who have been working in violation of the city ordinance. The men were working without a license.

WAR ON ORDINANCE.

A war is on at Spokane between the journeymen plumbers and the city authorities, on account of the plumbing ordinance regulating the fee for a license. The fee at present is $1 for renewal and $2 for a new license. The plumbers state that it is not the money they object to, but the principle.

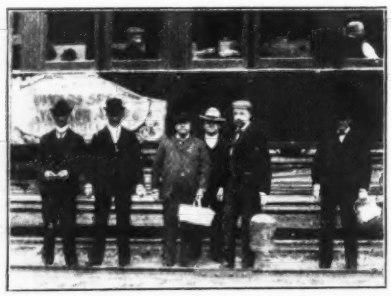
INVENTS WATER HEATER.

J. F. Yoho, a resident of Seattle, has invented an instantaneous water heater, which he will exhibit at the St. Louis Fair. The heater will burn gas, coal, wood, charcoal, in fact, all kinds of fuel, and the change required to burn one or the other can be made in a few seconds. A company known as the Yoho Bath Heater Company has been incorporated in Vancouver, B. C., to manufacture it.

CALIFORNIA MASTER PLUMBERS AT PASADENA.

PROMPTLY at 8:10 Sunday morning May 1, the Master Plumbers' Special train awaited the delegates and their ladies. Over one hundred and thirty of us jumped aboard, the bell rang and our merry party left San Francisco, bound for the Los Angeles Convention via the Southern Pacific Coast route.

The Master Plumbers' Special, consisting of two chair cars, smoker, baggage, and, most important, a diner, all up to date, was certainly a credit to the S. P.



The Working Committee between Acts.
G. C. Sweeney, J. L. E. Firmin and T. J. Stephens.

A more jolly, happy, representative party you never saw; they were just bound to have a good time, and they had fourteen hours to have it in. Delegates representing San Francisco, Oakland, Alameda, Berkeley, Sacramento, Stockton, San Jose and Watsonville were aboard the special. Many delegates went to the convention by various routes directly from their homes to Los Angeles.

From the moment when the starting bell rang to the moment when we stepped off the train at Los Angeles depot at 11:30 p. m. not the slightest thing happened which in any way marred the complete enjoyment of the party. As for the dining car, why, it was in continuous service, and when the San Francisco committee, consisting of G. C. Sweeney, Chairman T. J. Stephens, W. F. Wilson and J. L. E. Firmin handed the party over to the care of the Los Angeles reception committee, they felt that the complete pleasure enjoyed by our party fully repaid for all exertions.

The Los Angeles reception committee, among whom were noted F. A. Jay, R. F. Beattie, L. Lohman, V. Guercio, L. Scholes, A. Brogden, A. White, C. H. Mannell, Mrs. F. A. Jay, Mrs. R. F. Beattie, Miss Young awaited the delegation.

Thanks to the good judgment and forethought of the Los Angeles committees, our entire delegation were at their hotels and in their rooms safe and sound within an hour of their arrival, everyone dead tired but thoroughly happy.

Monday morning found all up bright and early and after exchanging congratulations with one another and with delegates generally, each little party took preliminary side trips, and took in the town generally.

But there was one great event to come off, and this was the championship base ball game which had been arranged between the Los Angeles and the San Francisco Locals. There have been base ball games before and there will be base ball games after this great event, but never such another. Anyone who says that the San Francisco nine was a back number don't know what he is talking about. It was worth half your life to watch Dick Rice making the run from base to base and finally landing at home base.

The slide that Jimmy Britt made to home was a record breaker. The famous "Slide, Kelly, Slide!" Pshaw, Jimmy, like his son, is a wonder. Billy Buick—nothing slow about him. He can pitch. (He once was a dandy) but J. H. Stoddard can't hold Billy's hot shots, though he proved himself the hero of the day by continuing playing after his thumb was split by one of Billy's hot ones.

The brilliant running of Charlie McCarthy was the topic with every one and as to Jim Lombard, show me the man of his weight who can make such a showing and continue smiling. Geo. Eastman, it is to be regretted, was under the weather, otherwise we should have recorded figures in place of ciphers to his record. Gimmel, he of portly figure, can bat and run and run and bat and go out. But why specialize the playing of the San Francisco boys, you know? Why, it was just simply splendid (or something else) though it was real mean of Jimmy Britt to twice corner Billy Buick between 3rd and home, and both times corner him to a finish, meanwhile himself stealing a run. What about the Los Angeles team? Why, they simply were not in it. True, they had several Lohmans, and a Guercio, and a Neal and other men of note in their nine, but about all they did was to make home runs, catch fly balls, pick up daisy cutters, steal runs and do all sorts of mean things.

The Two Nines at the Great Championship Game in Los Angeles.

The real base ball playing was done by the San Francisco team. Los Angeles can't kick at the umpire worth a cent, it takes Billy Buick to kick artistically, realistically. Oh, he is a beaut!

Tom Stephens, our state president, was the umpire. What admirable courage! Yes, he was fortified by wearing a full regulation foot ball player's armor, but it didn't save him. He was just a wild eyed nothing before the game ended, and if he hadn't rendered the judgment he eventually did, viz.: "a six to six tie, game closed on account of darkness," he would have been most unjust. He was that anyway. Tom Stephens is N. G. as an umpire, he is too just on the wrong side. The admittance to the ball game was nit. Twenty dollars had been cheap. But there are other things to think of.

Very wisely, the program did not provide any entertainment serving to attract delegates from their duties, so on Tuesday morning at 10:30 the delegates attended convention, and the ladies went hither and thither.

In Turners Hall, delegates numbering about 100 and members to the number of another hundred, assembled, and at 10:30 a. m. were called to order in temporary organization by State President T. J. Stephens. After President Stephens had addressed the assemblage as below, the regular order of business was proceeded with. It should be noted, that it is the custom of our State convention to admit all accredited members of the N. A. M. P. to our convention, because we believe it to be educational and tending to bring our members into closer touch. Of course, only delegates vote or deliberate.

ADDRESS OF STATE PRESIDENT T. J. STEPHENS.

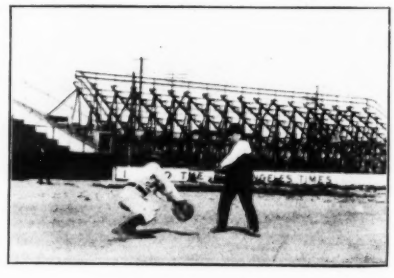
Gentlemen of the Fourth Annual Convention of the State Association of Master Plumbers of California: In opening this convention I am pleased to congratulate you upon the large representation here present.

I would impress upon you that this gathering has a duty to perform and that the legislation which may result from your deliberations will be far reaching either for our betterment or the reverse.

We are, first of all, business men, come together for business purposes, and I believe you come prepared to transact your business as business men should. I shall endeavor to be entirely just in my ruling. I do not claim to be a parliamentarian; therefore, I would kindly ask your indulgence and assistance, but this I would ask you to remember, that my whole intent is to assist you in your deliberations to the full extent of my abilities.

I believe this to be, perhaps, the most important period in the life of our organization, and that when the appropriate moment arrives we should express ourselves in such a manner as will preclude any misconception as to our sentiments relative to the principles for which we are organized and for which we are contending.

The bond of harmony now existing in the membership throughout the State of California is exceedingly gratifying and encouraging, and as you will see by my report later on, has greatly strengthened our organization and gives us firm ground to anticipate much betterment in the future.



Jim Lombard at Bat.

When we consider the peculiar features of California, as pertains her scattered territory, and peculiar conditions as regards the markets in which we buy, I think I am right in congratulating you and your officers for the high degree of organization to which we have arrived. I have no hesitation what-

ever in saying that California stands in the front rank of association states, and the prouder we should be of this fact, when we consider the conditions with which we have had to and are contending.

Our individual members, our locals and our state must remember that by unity, and unity alone, may we exert any appreciable influence; otherwise as individuals, as locals or as a state, singularly or collectively, we shall never hope to accomplish any useful betterment. Weighing all the facts of our purchasing markets, channels through which our business flows, and the rapid betterment of the avenues over which trade travels, thus daily bringing us into closer connections with the greater markets of trade and manufacture, it is readily seen that the only manner in which we can protect our business interests is by a loyal support of the National Association and its principles. The same fundamental principles upon which this great nation is built apply to our association.

I believe we should encourage home industry, home merchants, but we must apply business methods, otherwise our good intention would become abortive. With this brief address I would call this convention to order, and order that the usual business be proceeded with.

The first order of business will be the appointing of a Committee on Credentials. I am ready, gentlemen, to entertain a motion to that effect.

In regular order Messrs. Thos. Haverty of Los Angeles, Jas. E. Britt, San Francisco, Chas. W. Barrett, Fresno, A. E. Vesper, of Pasadena, H. M. Schultheiss, of San Diego, and W. F. Hockins, of Alameda, were appointed Committee on Credentials and within one hour reported the names of the gentlemen entitled to the rights of delegate.

Delegates to the State Convention, Association Master Plumbers of California, N. A. M. P.:

San Francisco—W. Buick, J. B. Butterworth, J. H. Brooke, J. Bertram, A. Curran, A. Coleman, J. Fitzpatrick, E. Grundy, H. Hufschmidt, T. F. Healy, C. T. Hoffman, J. S. Johnstone, F. Koch, M. Levy, J. Lombard, F. H. Mills, R. T. Murray, C. Mayer, A. Newmark, J. O'Hara, G. C. Sweeney, F. W. Snook, J. Shepard, C. G. Stuhr, E. N. Snook, P. F. Ward, R. Rice, A. G. Trezise, F. A. Gilley, J. A. Schalich, J. Holle, W. Loane, T. F. Kiernan, J. D. Welch.

Santa Ana—A. Butz, F. P. Nickey, J. McFadden.

Oakland and Alameda—W. F. Hockins, C. Doell, D. A. O'Brien, C. Sturm, G. L. Yager, J. McAllister, J. B. Cruz.

San Jose—J. W. Delaney, W. Fitts, H. Menzel.

San Diego—J. H. Woolman, C. Julian, H. E. Schultheiss.

Whittier—F. C. DuValle.

Fresno—C. W. Barrett, J. T. Anderson.

Berkeley—J. J. Menges, Geo. Stoddard.

Pasadena—A. E. Vesper, D. G. Chapman, N. White.

Los Angeles—F. A. Jay, R. F. Beattie, S. C. Brown, E. Crowell, T. Haverty, W. E. Hoffman, F. Huebsch, L. C. Lohman, A. H. Longley, C. H. Mannell, A. B. Marshall, G. W. Neal, C. T. Paul, L. A. Scholes, J. Risk.

Stockton—F. E. Goodell, C. M. Jackson, C. Brutchy, E. Gnekow.

Vallejo—C. L. Winchell.

Watsonville—W. C. Hays.

Long Beach—W. B. Joy.

Sacramento—Tom Scott.

Riverside—Chas. Shiels, D. Ormand.

Redlands—J. E. Tischer.

Hermosa Beach—F. P. Stewart.

Alhambra—R. H. Moorhead.

State Executive Committee—President T. J. Stephens, San Francisco; Vice-President V. W. Guercio, Los Angeles; Past President J. E. Britt, San Francisco; Treasurer W. F. Wilson, San Francisco; Secretary J. L. E. Firmin, San Francisco; Member F. P. Furey, Alameda; Member D. Crowley, Oakland; Member T. Scott, Sacramento; Member C. Foin, Fresno; Assistant Secretary R. F. Beattie, Los Angeles; Assistant Secretary C. T. McCarthy, San Francisco.

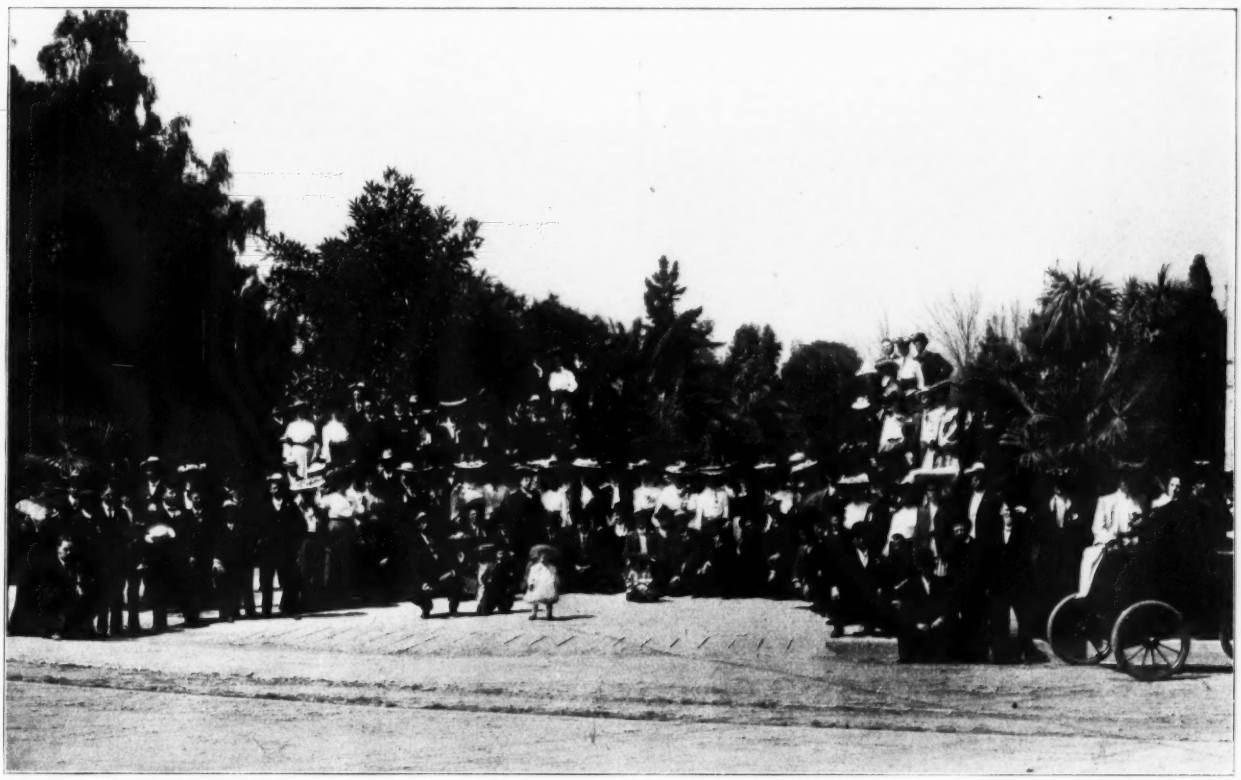
The report of the Committee on Credentials having been adopted, President Stephens declared the assemblage regularly convened, and business proceeded.

By a rising vote, the first business taken up by the convention was, "That this, the Fourth Annual Convention of the State of California N. A. M. P. does unanimously hereby express our confidence in National President E. D. Hornbrook and approve of his administration." It was ordered that State Sec. J. L. E. Firmin immediately telegraph the sentiments of the convention to Mr. Hornbrook.

Messrs. Jay of Los Angeles, Anderson of Fresno, Chapman of Pasadena, Delaney of San Jose and Britt of San Francisco were appointed as a Committee on Resolutions, to whom all resolutions were passed prior to consideration. An Auditing Committee consisting of L. C. Lohman, Los Angeles, F. P. Nickey, Santa Ana, and Mr. C. Hays of Watsonville was appointed and to whom the reports of State Officers was referred.

Pending the progressive report of the Committee on Resolutions, the committee adjourned to meet in executive session at 2 p. m.

At 2:15 p. m. President Stephens called the convention to order but it appearing that the Committee on Resolutions were not ready to report, it was ordered that the reading of the reports of the various state officers be proceeded with.



California Master Plumbers in Convention at Pasadena, Cal.

PRESIDENT'S REPORT.

LOS ANGELES, May 3, 1904.

To the Delegates of the State Association of Master Plumbers, California N. A. M. P., in convention assembled in Los Angeles, May 3, 4 and 5, 1904:

Gentlemen—I beg to herewith most respectfully submit my annual report as State President. I would congratulate you upon the progress made by our association, both as to increase and stability.

I should preface my statement by sincerely thanking our membership at large for the staunch support they have rendered to maintaining the principles of our organization; this is the strongest encouragement which can be given to their officers, and no one more fully appreciates their loyalty than I. My belief is that I am fully justified in promising that if you exert the same degree of loyal effort in the future that you have in the past, that your reward will be a just and wise consideration and protection of your interests. Again I would remind you, that without the loyal support of our members it cannot be expected that your officers can execute your will; nothing more tends to strengthen the efforts of your officers than does your

hearty, loyal support, nothing so weakening as the lack of this support.

During the past year several matters of considerable moment have been taken up by your state officers and executive committee. These matters will be more fully laid before you in executive session.

It has been a part of my duties as state president to personally visit nearly every important city and town of the state, and Mr. Firmin also has visited Eureka and other localities in the interests of our association. The vast territory of our state over which our jurisdiction extends is such as to require large expenditure of both time and money, but my opinion is that this expenditure is justified for many reasons, not the least of which is the moral influence it has upon our members. It shows that we are interested in both them and their welfare. In carrying out this state work I have covered over 4,000 miles of railroading, taking in a scope from San Diego to Redding, and have affiliated locals and individual members in many sections, among which are Hanford, Marysville, Nevada City, Point Richmond, Porterville, San Luis Obispo, Whittier, etc.

Organization work cost the state very considerable, and it would appear that we would be justified in expecting the national to bear a reasonable proportion of the expense; our population, relative to our territory, is sparse, rendering organization unusually expensive.

Charlie McCarthy Sailing Under False Colors at Pasadena.

With the view of concisely presenting to you the benefits derived by the consolidation of our state jurisdiction, I have prepared a brief statement, herewith, which I think will clearly demonstrate these benefits.

For several years prior to 1901 this state was divided into two jurisdictions, known as the Northern and Southern Jurisdiction of California N. A. M. P. In 1901 the state was consolidated into one State Jurisdiction, and I submit the following table:

RECAPITULATION OF MEMBERSHIP.

	Total membership.
1897-1898, two jurisdictions.....	220
1898-1899, two jurisdictions.....	222
1899-1900, two jurisdictions.....	296
1900-1901, two jurisdictions.....	256
1901-1902, consolidated	361
1902-1903, consolidated	453
1903-1904, consolidated	525
Number of local associations in 1897-1898.	11
Number of local associations in 1903-1904.	31

I take it, gentlemen, that this table needs no further comment upon my part. Considerable opportunity has been afforded me during the past year to learn of the large volume of business, and the vast number of details belonging to our organization, which have to be transacted in our state office under our State Secretary, Mr. Firmin, and I have noted the disadvantage under which the state office labors.

It is evident that it is unjust to the San Francisco local to have it pay the rent of offices, stenographer and other proper expense, as they have in the past, consequently the state executive committee empowered myself and Mr. Firmin to provide adequate state quarters and to assume a fair share of expenses, and I would ask that you approve of the executive committee's action.

Under existing national laws the payment of national per capita may be made by the locals directly to the national secretary or through the state secretary, thus leaving it optional with the locals. This method adds materially to the labors of the state office, is conflicting and involves a financial loss to the state.

Mr. Firmin and myself are of the opinion that the national laws should be so amended as to require that where there is a state association and this state association is held responsible for its per capita, then the locals should be required to pay their national per capita to and through the state office. Another source of misunderstanding is the custom of locals forwarding to the national officers the names of members added or dropped from their rolls. Each local should be required to forward to the state office all information as pertains to change in membership or officers.

It is quite evident that a source of much friction, misunderstanding and injury to both our members and the wholesalers is the custom of "drummers," who, in their over-diligence to sell, will quote prices and actually make sales to parties whom they assume will become master plumbers, or, in other words, presumed prospective master plumbers, parties who, as a fact, have not qualified to the least requirements of the term "legitimate." Time and again have complications arisen from this abuse of giving quotations and making sales to parties who were not, and who never intended to become legitimate master plumbers, not to "represent the industry of plumbing." Respectfully,

T. J. STEPHENS, State President.

REPORT OF STATE VICE-PRESIDENT.

LOS ANGELES, May 3, 1904.

To the Officers and Members of the State Association of Master Plumbers of the State of California:

Gentlemen—As your State Vice-President I beg to submit the following report: Most of our organization work during the past year was done by your worthy President, Mr. T. J. Stephens, who has traveled through the state and organized several new locals. The only local organized in the southern part of the state was Whittier, which was organized by myself. In most localities harmony has been the watchword and in very few instances has an association had a drawback by members dropping out, which is shown by our magnificent gain of nearly fifty new members. The gain accomplished was difficult for the reason that it included small localities which have not many master plumbers eligible to membership, and who as a general rule are connected with other branches of business. This makes it a great deal harder for them to realize the protection given them by our association.

As far as organization work is concerned I deem it advisable for the state association to send one of its members through the state to visit all locals, especially the smaller ones, for it is of them that the jobber takes so much undue advantage in disposing of his goods at will.

I deem it necessary for every member of this association to keep its officers well informed as to what is going on in their respective localities. They should take it upon themselves to have their loyalty felt, thus demonstrating the manner in which plumbing material should be handled. Careful watching is the protection of every member in our great associations, and puts them in a way to become merchants and have a financial standing in the community. This is justly due to every member that has been loyal. Therefore, we must have the hearty co-operation of each and every member of the association, thus putting us to the front, and gaining recompense for our labor.

A great many of our members are led to believe that after joining the association their work is completed and everything comes to them; this is serious error, for they must not be idle, as their task has but commenced. They must be on the field of action at all times, not leaving one stone unturned tending to gain them their rights or to adjust complaints amicably and for the welfare of all concerned.

The officers of this association deserve great credit for the manner in which they have deliberated on the vital questions brought before them during the past year, and they should be thanked for their untiring efforts to bring victory to where it belongs.

As your National State Vice-President, several cases have been called to my attention which were in direct violation of the Cleveland resolutions. The parties concerned were visited by myself, and upon their assurance of doing better in the future these matters were settled in a quiet and peaceable way. In matters pertaining to the association interests, it is my firm belief that if members work harmoniously in order to bring about the necessary results their aim will be accomplished. My only wish is to see the association continue in the flourishing manner in the future which it has in the past.

Thanking the officers and members for their kind indulgence during my administration, I am, fraternally yours,

V. W. GUERCIO,
State Vice-President California.

STATE ASSOCIATION MASTER PLUMBERS, CALIFORNIA.

W. F. Wilson, Treasurer's Report.

April 30, 1904.

1903.	RECEIPTS.		
May 11.	Balance on hand.	805.40	
1904.			
Mar. 25.	Received from Secretary ...	1,568.84	
Mar. 26.	Received from Secretary ...	250.00	
Apr. 26.	Received from Secretary ...	1,345.35	
			$3,969.59
	Disbursements as per itemized statement		2,172.74
	Cash balance on hand.....		$1,796.85

STATEMENT OF CASH BALANCES.

State Secretary John L. E. Firmin,
(1902-1903) 1903-1904.

RECEIPTS (RECAPITULATION OF PER CAPITA.)

	Fiscal year 1902-1903.		
May 13.	To cash balance on hand	$178,95	
May 13.	To cash balance per cap. rec'd fiscal year '02-03	25.75	$204.70
	Fiscal year 1903-1904.		
May 3.	To cash rec'd from State Pres. T. J. Stephens for S. P. R. R. rebate.	$17.84	$17. 84
May 3.	To cash rec'd from State Ind'l per cap	356.50	
May 3.	To cash rec'd from State Local Asst. per cap.....2,790.75		
May 3.	To cash rec'd from Nat. Ind'l per cap	140.00	
May 3.	To cash rec'd from Nat. Local Asst. per cap	234.00	
			3,521.25
	Grand total cash receipts 1903-1904		$3,743.79

DISBURSEMENTS.

	Fiscal year 1903-1904.		
Mar. 26.	By cash paid State Treas. Wm. F. Wilson $1,568.84		
Mar. 26.	By cash paid State Treas. Wm. F. Wilson	250.00	
May 3.	By cash paid Nat. Sec. J. R. Richardson	372.00	
Apr. 26.	By cash paid State Treas. W. F. Wilson	1,345.35	
			3,536.19
	Grand total for disbursements		3,536.19
	Net balance in hands of State Secretary		207.60

April 26, '04. JOHN L. E. FIRMIN.

The reports of the state officers being duly acted upon the convention was ready to take up the report of the Committee on Resolutions.

Mr. James E. Britt, chairman of Committee on Resolutions, in a report progressive,

reported that the committee recommended the adoption of all the recommendations made by State President T. J. Stephens in his annual report and as advised by State Secretary John L. E. Firmin.

The convention adopted the recommendations of the committee as pertains to the President's report.

The convention then adjourned to meet in executive session at 10 a. m., May 4.

May 4, 10 a. m.—The committee recommended that the resolution presented by Thos. Haverty of Los Angeles pertaining to apprentices be adopted, as follows:

Resolved, That we most emphatically condemn the action of National and Local Journeymen Plumbers' Association, wherein they prohibit the employment of, and refuse to work with, any new apprentices in our trade; thereby prohibiting a respectable and ambitious young man from learning a trade, which, in our opinion, should be open to him.

We believe the action taken by the Journeymen to be un-American, extremely selfish and decidedly against the best interests of our business and the public welfare, and that it should not be tolerated in a free country, and that every ambitious boy should have the opportunity to better his condition, and that this right should not be denied him by any man or body of men. And we further recommend that whenever and wherever possible such rules and actions should be vigorously combatted.

The Committee on Resolutions offered as a substitute for the resolution presented by the Berkeley Local wherein it proposed a state law to the effect that no local should affiliate with any carpenters', builders' or other contracting organization under penalty of expulsion, the following:

Resolved, That it is the sense of this convention that it is not for the best interests of this association that locals throughout the state should affiliate with builders' associations, and we recommend to our various locals that they refrain from so doing.

This substitute was adopted, and the convention adjourned to meet in executive session at 2 p. m.

Convention called to order by State Vice President Vincent W. Guercio, at 2:15 p. m. and the first business was the taking up of the report of the Auditing Committee. This committee reported that the financial report of both the Treasurer and the Secretary were found correct.

The Committee on Resolutions reported that they had carefully considered the proposed state law as presented by Pasadena, and that they had concluded to make no recommendation, so that the resolution was before the house in its original form.

This resolution aimed at providing a state law defining duties of journeymen and master plumbers, examinations, registration, and the regulation of plumbing.

In sentiment, it met with the hearty approval of the convention, but it was the opinion that this is not the proper time to advocate a state law for several reasons, among which are, that it would lead to considerable conflict with existing municipal laws, and that the public opinion has not yet been educated to the point where it would demand such legislation. The convention was of the opinion that each locality should persistently advocate sanitary legislation, thus creating public sentiment favorable to state action.

At this stage telegrams were received from National President Hornbrook, wherein he expressed appreciation of California's loyalty and offered his congratulations.

After considerable routine business the convention then proceeded to the election of officers to serve for the ensuing year. This resulted in the election of the following gentlemen:

STATE OFFICERS ELECT.

President—F. A. JAY, Los Angeles.

Vice President—A. E. VESPER, Pasadena.

Treasurer—W. F. WILSON, San Francisco.

Secretary—J. L. E. FIRMIN, San Francisco.

First Assistant Secretary—R. F. BEATTIE, Los Angeles.

Second Assistant Secretary—CHAS. T. MCCARTHY, San Francisco.

Sergeant-at-Arms—D. CROWLEY, Oakland.

Members of State Executive Committee—C. L. FOIN, Fresno; J. H. JULIAN, San Diego; T. SCOTT, Sacramento.

All of the above officers elect, together with Past President T. J. Stephens of San Francisco, compose the State Executive Committee for the ensuing fiscal year.

National Delegates elected to represent the State Association at the St. Louis Convention, 1904:

Thos. J. Stephens of San Francisco.

Frank P. Furey of Alameda.

Frank A. Jay of Los Angeles by virtue of his office.

Nomination to be presented at National Convention, 1904, for National State Vice President for California:

A. E. Vesper of Pasadena.

In the kindliest manner Ex-State and National Vice President Vincent W. Guercio of Los Angeles installed State President elect Frank A. Jay of Los Angeles. It was indeed an agreeable surprise to the convention to discover the remarkable abilities of Mr. Guercio as a presiding officer and the dispatch and harmony of the convention's deliberations were greatly the result of this gentleman's abilities.

There being no other business before the convention, the place of holding the next state convention was fixed, the State Capitol, Sacramento, being selected.

With a vote of thanks for Los Angeles and the Ladies' Auxiliary, carried with three cheers and a tiger, and a vote of thanks to the retiring officers, the Fourth Annual Convention of the State Association of Master Plumbers adjourned *sine die*.

After the adjournment of the convention on Tuesday evening the delegates participated in a smoker tendered by the Los Angeles local, President Jay of Los Angeles presiding.

President Jay disclosed exceptional abilities in drawing talent out of the boys. One after another was brought from way back seats. Their powers of entertaining were surprising, considering their native modesty. As previously noted the ladies attended to theater and supper.

On Wednesday the delegates attended strictly to business, but the ladies were taken in hand by the Los Angeles Ladies' Auxiliary and they enjoyed a delightful trolley ride to all places of interest in and about Los Angeles.

At one time it looked as if the business of the convention would consume Thursday, but the businesslike manner in which the delegates performed their duties gave them Thursday free, and nearly all of us enjoyed a ride up to the top of Mount Lowe via the wonderful railway.

Many continued the ride from the ending of the railway to the very apex of the Mount, using dear little, gentle donkeys as the medium of locomotion. Thursday evening found every one attending the grand ball tendered by the Los Angeles local to the visiting delegates. It was dance, refresh, dance, refresh and repeat, until midnight, then hurry up and to bed, so as to get up early for Pasadena Day.

Friday morning found the Pasadena local's committee, headed by Mr. A. E. Vesper, ready for us. All on board the trolley and away we went. How many and how beautiful the sights we saw we shall not attempt to mention, much less describe, but this we noted: flowers, flowers, flowers everywhere.

After such a trolley ride as never was before we were ushered into a large, well arranged hall in Pasadena, welcomed by its mayor and other officials, and then to the adjoining hall where a bountiful repast awaited us. After singing "Praised Be He From Whom All Blessings Flow," which was gratefully rendered, we ate, Oh! how we ate. We were over two hundred and thirty. At last, having satisfied our appetites, again we took the trolley and were conveyed to the ostrich farm, each delegate wearing the castiron countenance, and determined not to understand his lady when she mentioned, in a casual way, praises of feather fans, boas, plumes, feathers, tips, etc. The very enjoyable novelty of the ostrich farm having been taken to the fullest, again we took the trolley and arrived in Los Angeles more than pleased. Pasadena should be proud of herself; she were justified even to assuming a strut. Not only was she generous but her judgment was admirable. As to her hospitality, it was boundless. Thank you, Pasadena, your glorious San Gabriel valley, your local, your ladies' auxiliary. On Saturday the Los Angeles local again took us in hand, and taking the Salt Lake railroad we were soon arrived at the ideal picnic ground named Verdugo Park, up in the foothills, such a beautiful, pleasant spot. Many were the surprises that were ours, but the wonder of all was the barbecue.

We had been told that a "grand barbecue" was to be given in our honor, but judging from experience the knowing ones pictured great hunks of ill prepared meat and other provender, more ill-served. Judge our surprise at enjoying one of the most delightfully cooked and served dinners we ever sat down to. Meat broiled to the turn, the menu was a wonder. Why, we ate and ate again.

As to the service, it was as ideal as the grounds. Every man Jack of the Los Angeles local wore large white aprons, Vince Guercio, our State Vice, being chief broiler. President Jay and Mr. Haverty looked and acted the real Boniface.

Never were guests served with such self-denying hosts; no exertions were too great for them. When men, independently wealthy, join with the man who is struggling to gain a stand, both determined to render their hospitality grateful to their guests, it shows a better side of nature and establishes a bond of brotherhood.

All things, 'tis said, must have an ending and so, with the evening's shade, merry, tired dancers, and the rest of us boarded the train again, soon to be in Los Angeles.

The convention over, side trips were again in vogue; some here, some there. Nearly every one went to enjoy Catalina Island, its fishing, its boating and its wonderful Marine Garden of Paradise, as seen through the glass bottom boats. Beauties of beauties, this sea garden, but to describe it we shall not attempt.

Your patience already tired shall be taxed no more, but I'll wager that every delegate and every lady could entertain you for a week with the relation of what they did and what they saw when at the fourth annual convention of the Association of Master Plumbers of California.

N. A. M. P. & X. Y. Z.

Through the Chicago representative of The Louis Lipp Co., of Cincinnati, we are in receipt of their handsome catalogue issued last year. It is a fine contribution to commercial literature.

"The Boilerologist" is the title of a circular issued by Walker & Pratt Mfg. Co., of 31-35 Union st., Boston, Mass., to endeavor to assist the heating trade in the solving of heating problems.

A second edition of "The Boiler Magazine" has been issued by Kellogg-Maekay-Cameron Co., of Chicago. It was a stroke of genius in the first place, and the demand for a second edition shows it met a hearty welcome from the trade.

Boston and New England

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A New Shop.

W. A. Cooper, of the firm of Cooper & Jacobs, of Natick, Mass., is opening a plumbing and steam fitting shop at Beachmont. Mr. Cooper is the patentee of a number of articles in the plumbing line.

In Bankruptcy.

A. H. Seabury, steamfitter and heating contractor of 91 High street, Boston, has been forced into bankruptcy. While the failure is not a heavy one the many friends of Mr. Seabury express some surprise and extend their sympathy to him. About a year ago the old firm of Ross & Seabury was dissolved by mutual consent, Mr. Seabury remaining at the old stand and continuing the business.

Large Contract Let.

The contract for building the new Good Samaritan Hospital in Cambridge was placed last week with A. C. Whitney in Post Office Square, Boston. The contract is for the building complete and includes the heating and the plumbing. Mr. Whitney has awarded these contracts, for plumbing to W. A. Johnson, 77 Dover street, for the heating to Ingalls & Kendriken. Bids were made to the builders and are not public property.

Don't Help the Trade.

Strikes and rumors of strikes in the building trades and their allied manufacturing interests do not help to establish confidence by a long ways. The conditions are now far from right in the New England territory and every little setback is to be deplored. The Lynn master plumbers must have felt that such was the case and arranged for another year of quietness as quickly as possible. It is hoped that the Tube Works strike can also be quickly adjusted. It is work not strikes that we should have now.

Bound to Be Successful.

James Pinner, formerly for a number of years foreman plumber for Kendrick Bros., of Brookline, has recently purchased the shop and fixtures, good will, etc., of the estate of P. J. Winn, at Coolige Corner. Mr. Winn conducted there a very lucrative general jobbing plumbing business for a number of years before his death, even though somewhat handicapped by increasing age and ill health. Mr. Pinner assumes charge with not only a thorough knowledge of the business, but of the customers also, and it would seem that success was a foregone conclusion.

Will Build Up-to-Date Warehouse.

New England Heating & Supply Company, of 53 State street, Boston, Mass., are about to increase their capitalization by $15,000 for the erection of a warehouse in Boston, which will be an up-to-date building. The basement will be used for storage of pipe and fittings, and it will have a pipe machine for cutting all sizes of pipe. The first floor will be used as storage room for boilers, radiators and furnaces; the second floor for storage of valves and sundries, and the third floor will be a workshop. The building will probably be finished this year and it will have all the latest improvements.

In Bad Condition.

Not long ago one of Boston's foremost plumbers was called to inspect the plumbing system of one of the newer and finer club houses on the shores of the Bay state. The members were troubled with foul odors and yet nothing seemed radically wrong to them. Upon inspection it was found that the drainage system led to a terra cotta drain in the cellar and that the stacks that led to the roof were all out of condition and never had been installed with either care or knowledge. It was a case of contract plumbing without inspection or necessary laws to keep within the best sanitary precautions. The expert, it is understood, advised the immediate revision of the entire plumbing and drainage system. Even the millionaires get careless sometimes and try to buy too much with too little.

The New Rule on Plumbing Permits.

Lately Building Commissioner Mulcahey, of Boston, has issued an order that all applications for plumbing permits must be signed by the owner of the property on which the work is to be done. This new rule has caused no end of discussion and comment on the part of the master plumber. At first sight it seems to add to his already burdensome load of formalities and time users, but careful examination shows that the order has much to recommend it and is likely to prove a boon to that same master plumber. About the worst that can be said of it is that it will take both time and trouble to see the owner in order to get his signature. Having reached him, however, the explanation of the cause of the visit can be made to prove a most excellent introduction with all likelihood of lasting benefit. Instead of being forced to remain in the background and to assume only such position and prominence as the builder or contractor may select, the master plumber now becomes, perforce, to the owner a reality. In other words, he is offered the opportunity to assume the position that is rightly his as a constructive merchant and mechanic.

GRADUATING EXERCISES AT PLUMBING SCHOOL IN BOSTON.

On Friday evening, May 13, the Plumbing school of the North End Union held its graduating exercises at the Union Building, 20 Parmenter street, Boston. Supt. Saml. F. Hubbard had invited a number of the Master Plumbers of Boston and vicinity to be present and quite a large number embraced the occasion to get more intimately acquainted with the school and the union in general. Among those present were Prest. John Manning of Master Plumbers' Association of Boston and vicinity, Ex-State and Local President Daniel Shannon, Ex-Prest. C. H. Cronin, Natl. Vice Prest. David Craig, Mr. Burnham of Burnham & Stevens, and a number of others. Shortly after eight o'clock Mr. Hubbard came into the exhibition room and asked that those present would come up to the hall. When all were seated he called the Presidents and Ex-Presidents to the platform and introduced Edwin D. Mead. Boston's famous educator, as chairman of the evening. In his opening address Mr. Mead spoke of the fact that the North End school of Plumbing was one of the pioneers of this class of schools in this country and referred most gracefully to those on the stage with him and to the hearty support that the Master Plumbers' Association had always accorded the school. He also called attention to the meeting of Social Science Conference then being held in this city at which the great point being discussed was the industrial element in education. He then introduced Prest. Manning whose address was short but to the point. He advised the boys to remember that their diplomas did not give them the right to think that they knew all that there is to be known and go slow at their work and acquire speed by experience following the knowledge they had acquired. Above everything else to be thorough in their work as the world wants and will pay for the best work. Mr. Manning was followed by Daniel Shannon, who pointed out the golden opportunity offered by the school to those who were its pupils and contrasted it with the old apprentice system of his early days. Claimed that the course was meant to be a preparatory one to be supplemented by the larger, higher one to be had in the broad school of actual experience. C. H. Cronin was the next speaker and proved to be most interesting. He spoke of his early, personal doubts as to the actual benefits to be derived from the school and how he had made a business to study by comparison the successes of the boys who had received a course in the school with those who had not had such a course and he was prepared to say that the graduate of the school had the other "beaten a block," in every thing that went to make up a good and thorough plumber. He then went on to speak of the careful examination and marking of those who were about to receive diplomas and predicted that these diplomas would prove most valuable assets and as the years went by and their successes came they would find that the intelligent master plumber would welcome them into the ranks as educated competition was not the kind to be feared, but just the kind wanted and welcomed. He spoke of the chances in the business and the increasing demand for high class executive ability combined with a technical education on the large work of the present day that runs into thousands where formerly it was hundreds, and ended with a most hearty endorsement of the school and its work. Vice-President Craig was the next speaker. His address was in the line of encouragement to the boys and strong advice to follow out for themselves the solution of the problems that confronted them. To investigate the cause and know the why as well as the how. Pointed out that there were other benefits to be gathered from the school beside those that the diplomas stood for. The industrious habits the assurance and experience of co-criticism. He claimed that the Trade School was the proper solution of conditions arising from the old apprentice system, and that it had so proven itself. That the education derived was the thing needed to wipe out that heritage of ignorance from earlier generations. At the conclusion of Mr. Craig's address Supt. Hubbard asked for Mr. Craig's explanation of the position occupied by the National Association regarding Trade Schools and the Apprentice system. In answering this the Vice-President referred to the report of the Committee on the Apprenticeship question as made at San Francisco. Prest. William E. Huntington of the Boston University was the final speaker. He encouraged the boys to win their way by hard work. He pointed out how plumbing had advanced with and could be taken as a mark of advance civilization. He exhorted a thoroughness and told of his early lesson in this direction. Thoroughness and conscientiousness of that kind that would demand that the work that is out of sight in the wall should be as carefully constructed as that in plain sight. Diplomas were then awarded to E. W. Jones, W. J. Malcomb, G. J. Patterson, C. Harkness, W. J. Murray.

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TENEMENT JOB AWARDED.

F. H. Reiher, of 3708 Third avenue, has been awarded the contract for plumbing a large tenement house at One Hundred and Eighty-ninth street and Third avenue for Wm. Wainwright.

REPORTS LIVELY JOBBING TRADE.

L. G. McCann, of 688 Tremont avenue, is having no cause for complaint. He has a very large jobbing trade in the residential section surrounding his establishment, and this is more than keeping him busy.

TO MAKE BOILERS AND FURNACES.

Bonson Furnace & Boiler Company, of Chicago, has been incorporated with a capital of $50,000 to manufacture furnaces and boilers. The incorporators are W. M. Bonson, N. E. Utt and L. I. Flowers.

NEWLY INCOPORATED.

The Alexander Bryant Plumbing Co, of No. 1 Madison avenue, has been incorporated with a capital of $100,000 to conduct a plumbing business. The directors are Eugene Buckley, Frank Kubischta, of New York City, and J. B. Ackerson, of Rutherford, N. J.

A HANDSOME JOB.

Wm. J. Julig, of 203 Lexington avenue, has just completed the entire overhauling of the plumbing in Frederick Brooks' residence at 43 East Sixty-eighth street, the job amounting to about $7,000. About thirty new fixtures were installed, including baths, showers, etc.

OPENED NEW YORK OFFICE.

The New York and Hoboken Steam Fitting Company, of 74 Harrison street, Hoboken, N. J., has opened a branch in Manhattan at 457 Canal street. They are engaged at present with the installation of a new heating plant in the residence of Mr. De Contin, in Mt. Vernon.

PERSONAL.

M. Melman Shaffer, vice president and treasurer of the Kenney Manufacturing Company, 36 East Twenty-second street, is absent on a trip to Europe. George Robinson, buyer for the same company, is making a business trip through the middle west, visiting Cincinnati and other principal cities.

CONTRACT FOR PLUMBING ARMORY.

Edward McCann, 397 First avenue, has been awarded the contract for the plumbing in the new armory being erected for Troop C, N. Y. N. G., in Brooklyn, and will begin operations on same in the near future. The contract includes about sixty fixtures, including fourteen showers, plunge baths, etc., and will approximate $16,000.

NEW PIPE COVERING COMPANY.

The National Air Cell Covering Company, with offices at 411 Washington street, and factory at New Orange, N. J., has taken over the low pressure department of the Monarch Asbestos Company, also of the same address, and will make a specialty of catering to the wants of the heating and plumbing contractors. J. A. Scharwath is in charge of the sales department.

TAKES NEW AND LARGER QUARTERS.

Alfred B. Sands & Son, who have been for the past thirty years at 134 Beekman street, have taken the building at 242 Water street, recently vacated by Phelps Bros. The street floor will be utilized for a fine display of marine plumbing fixtures, with offices in the rear, while the basement and four floors above will be used for manufacturing and storage purposes. Increasing business necessitated the change.

CHANGE LOCATIONS.

The Model Heating Company has discontinued their office and warehouse at 82-84 Center street, also their office at 346 Broadway. They will take offices on the second floor of the Leonard building, 89-91 Center street, where they will carry emergency repairs and specialties, and have a warehouse in Jersey City. From now on the most of their shipments will be direct from their factory in Philadelphia.

BUSY MASTER PLUMBERS.

August Klein, of 653 Second avenue, is overhauling all of the plumbing work in a six-story flat building at 346 East Forty-second street for A. J. Lenahan. Mr. Klein has several other good jobs on hand.

Joseph Murray, of 403 West Fifty-ninth street, is making extensive alterations to the plumbing work in the residence of M. Abrahams at 458 West One Hundred and Fifty-eighth street.

M. P. Perault, of 2455 Broadway, has just completed the plumbing for the residence of Mr. Wilson at Ardsley on the Hudson. Five new bath rooms were installed.

The Johnson & Morris Co., of this city, has secured the contract for installing the heating plant in the new building for the Chesapeake & Potomac Telephone Company, in Baltimore, Md., which was recently destroyed by the fire.

J. S. Goebel, of No. 46 West One Hundred and Twenty-fifth street, is installing the plumbing in a large office building on Cliff street.

J. J. Falihee, of 203 West Eighty-second street, is engaged with the plumbing for two apartment houses at Ninety-eighth street and Park avenue.

John McCarron, of 915 Sixth avenue, is making extensive alterations to the plumbing work in the residence of Mr. Goldsmith at No. 19 East Seventy-fourth street.

J. J. Gordon, of 161 West One Hundred and Thirty-first street, has the contract for plumbing a large tenement house at No. 1638 Avenue A for C. Daniel.

Jacob Nordinger, of 308 East Ninth street, is plumbing a large hotel building at 158 East Twenty-third street for Mortimer Smith.

Cunningham & Brady, of 2460 Broadway, have been engaged for some time with the overhauling of the plumbing in an apartment building at 2104 Broadway.

Chas. Renzland, of 426 East Sixteenth street, has been awarded the contract for plumbing a large tenement building at 423 East Fifteenth street for George J. Mueller.

Eugene J. Flood, of 682 Sixth avenue, has just completed the plumbing for a handsome residence at 342 West Forty-seventh street for Henry Eckart. New baths and toilets were installed.

Thomas J. Cummins, of 1035 Third avenue, is plumbing four large apartment houses at One Hundred and Fifty-sixth street and Amsterdam avenue for John D. Crimmons.

G. E. Doscher, of 214 East Thirty-eighth street, has just finished the plumbing for a large tenement house at 445 Second avenue. New toilet rooms and similar work were installed.

H. W. Webb, of 198 Lexington avenue, has no reason to complain. He enjoys a very large jobbing trade, principally in the residence district which surrounds his shop. Mr. Webb is looking forward to an exceedingly busy year.

BROOKLYN

GOOD RESIDENCE WORK.

E. C. Bryan, of 329 Flatbush avenue, is plumbing the residence of Mrs. McKinney, at Park and Carlton streets.

SCHOOL WORK.

James Harley, of Brooklyn, is completing the plumbing for a large school building at Houston and Lewis streets.

PLUMBING FORTY NEW HOUSES.

Andrew Walker, of 278 Seventh avenue, has the plumbing for forty large houses in East New York well under way.

PLANS FOR DWELLING.

M. W. Delgaudio, of 401 East One Hundred and Fifteenth street, has plans for a brick dwelling to be erected at Seventy-third street and Fifteenth avenue, Brooklyn.

IMPORTANT MEETING HELD.

The annual meeting of the Building Trade Employers Association was held on Tuesday afternoon, April 12, with a large attendance of members.

AN IMMENSE JOB AWARDED.

Jung Bros., of 998 Broadway have been awarded the contract for the plumbing for the new Broadway Hotel at the corner of Myrtle avenue and Broadway, Brooklyn.

WILL MOVE TO BETTER QUARTERS.

Dowdswell Bros., of 92 Seventh avenue, expect to remove into larger quarters at 103 Seventh avenue. Their factory located at 189 Washington street is to be moved to 399 Bridge street. This is a firm of hustlers—never busy enough.

NEW YORK STEAM AND HOT WATER FITTERS IN ROCHESTER.

The tenth annual convention of the Master Steam and Hot Water Fitters' Association of New York state was held May 10 at the Whitcomb House, Rochester, N. Y. The body is a part of the national association.

The Board of Directors met at 10:30 o'clock in the morning. Those in attendance were: John A. Creelman, Rochester; William N. Tobin, Syracuse; Frank Dobson, New York; Charles Geiger, Buffalo; E. Rutzler, New York; John T. Sadler, Elmira, and J. Henry Howe, Rochester. One member of the board was absent. Henry B. Gombers, of New York, attended as secretary of the state, New York city and of the National Associations.

In the afternoon a resolution was passed indorsing the Mortimer bill so far as it relates to the letting of heating contracts apart from other contracts involved in the erection of buildings by the state, county and municipal governments. The Mortimer bill passed the Assembly, but at such a late date that it did not reach the Senate. At the next session of the state Legislature it is the intention of the association to revive the measure and introduce it under a new title.

The following officers were elected: President, William H. Gaylord, Binghamton; vice-president, Frank H. Falls, Rochester; secretary and treasurer, Frank Dobson, New York; sergeant-at-arms, William Milligan, Rochester. The Board of Directors will consist of these officers and E. Rutzler, New York; J. Henry Howe, Rochester; Edward F. Joy, Syracuse; John A. Creelman, Rochester; Charles Geiger, Buffalo; Henry B. Gombers, of New York, was appointed recording secretary of the board.

Philadelphia

Office: 18 24 S. Seventh Street

JNO. K. ALLEN
President

ELMER CRAWFORD
General Manager

Representative, E. DeForest Winslow.

Telephone 21-41

PLUMBING NEW WAREHOUSE.

Thomas D. Clark, of 267 South Eleventh street, is installing the plumbing in a new warehouse at 116 South Front street for Thomas Roberts.

MASTER PLUMBERS HOLD REGULAR MEETING.

The Master Plumbers' Association of Philadelphia held their regular meeting in the Builders' Exchange, on Thursday evening, May 12, a good attendance being on hand.

PLUMBS LARGE MILL.

James A. Flynn, of the southeast corner of Thirteenth and Sansom streets, has completed but recently the plumbing for a large mill at Oxford and Howard streets for Dorman Bros.

A NICE HEATING CONTRACT AWARDED.

The Makin Heating Company, of 24 South Seventh street, has just landed the contract for installing a combination warm air and hot water heating system in the handsome residence of Lewis F. Benson at 2014 De Lawrence street.

HEATING NEW ADDITION TO UNIVERSITY HOSPITAL.

The J. P. Wood Heating Company, of 39 South Fourth street, is installing the heating in the new addition to the University Hospital at Thirty-third and Spruce streets. R. G. Loughery, of 37 North Eleventh street, is doing the plumbing.

BUSY IN THE PLUMBING LINE.

W. J. Weidner, of 507 West Susquehanna avenue, is doing the plumbing for a new structure at Rockland and Lawrence streets for Mr. Lanbaugh.

W. H. Davenport, of 104-106 Conaroe street, Manayunk, is putting in the plumbing for a new dwelling at Baker street and Green Lane for Mr. Stafford.

SUBURBAN WORK.

John C. Gunzer, of Chestnut Hill, is doing the plumbing for the residence of George C. Thomas at Sunset and Norwood avenues.

J. Morris, of Bryn Mawr, is installing the plumbing in the residence of Frank Harmon, in Bryn Mawr.

S. J. Brophy, of Jenkingtown, is plumbing the handsome residence of Jos. S. Newbold on Washington lane.

George K. Morris, of North Wales, is employed with the plumbing for J. Evan Detwiler's residence in that suburb.

The Wayne Heating Company, of Wayne, is installing the steamheating in the new addition to Mrs. Hervey Borie's residence in Wayne.

Geo. J. Diggins, of Chester, has the contract for plumbing the residence of Wm. Simpers, at Norfolk, Pa.

Henry J. Norton, of Wynnewood, is at work upon the plumbing for the $10,000 residence of Joshua L. Bailey in that place.

M. D. Gould, of Moore, is placing the plumbing in the residence of A. J. Ettintard at Ridley Park.

A. D. Harvey, of Fox Chase, is busy with the plumbing for two residences for Chas. Knight in Fox Chase.

BUSY MASTER PLUMBERS.

G. W. Nicholson & Bro., of the northeast corner of Sixteenth and Dickinson streets, are busily employed with the overhauling of two residences at 2704-06 Jefferson street. They are also overhauling the plumbing work in a residence at 1450 North Twenty-seventh street.

The plumbing contract for the new residence at Germantown avenue and Greene street has been placed in the hands of Thomas Shaw, of 5823 Germantown avenue.

The contract for plumbing a residence at the southwest corner of Sellers and Penn streets has been awarded to John B. Wilson, of 4209 Frankford avenue.

Smalley & Hurst, of 207 East Chelten avenue, Germantown, were the successful bidders on the new residence located on Knox street, near Seymour. Mr. Holmes is the owner.

John Danzeisen, of 3637 North Seventh street, has the contract for plumbing three houses at 3430-32-34 North Tenth street. Mr. Danzeisen reports a brisk business in the jobbing line.

Edwin J. Sage, of 3828 Market street, is at work upon the plumbing installation for a residence at No. 25 North Thirty-eighth street.

William J. Beatty, of 6000 Germantown avenue, is engaged with the remodeling of the plumbing work in a residence at 338 Manheim street and in another one at 5917 Greene street.

The contract for plumbing the new residence on Upsol street near Jefferson has been awarded to Wm. J. Newell & Bros., of 1713 Sansom street. Mr. Holton is the owner.

Frank Kramer, of 959 North Eleventh street, is engaged with the plumbing for a residence at the southwest corner of Twelfth street and Fairmount avenue.

J. T. Bryan, of 148 Vine street, is doing considerable plumbing work in a store and dwelling at 123 Vine street and in a building at 317 North Front street.

Richard L. Martin, of 1116 West Susquehanna avenue, has the contract for plumbing a residence at 2105 North Twelfth street. Mr. Martin reports things very lively up his way.

Storch & Scheid, of Broad street and Passyunk avenue, have received the contract for plumbing an operation of twelve new houses on South Eleventh street for Mr. Ward and also for plumbing an operation of twenty-three houses on South Tenth street. Mr. Gallagher is the owner for the last operation.

Pittsburg and Vicinity

IS DOING WELL.

Oral W. Irwin, who opened an attractive plumbing establishment at 718 Fifth avenue, McKeesport, is doing well and looks forward to a good season's business.

PLEASANT LOCATION.

The Allegheny Plumbing Company has recently removed to cheerful and convenient quarters at the corner of Union avenue and Parkway from the old place on West Ohio street.

NEW PLUMBING FIRM IN MCKEESPORT.

Smith & Reed is the name of a new plumbing firm which has lately opened a handsome and roomy show room and shop at 311 and 313 Ringgold street, near the B. & O. railroad, McKeesport.

NEW FIRM HAS GOOD PROSPECTS.

A new plumbing firm which has made a very gratifying start is Ganz & Wirth, at 32 Hazel street, Troy Hill, Allegheny. Both are young men but have had good training and plenty of experience. Harry E. Ganz has been at the trade for seven years, the last four of which were spent with Stimson, Kennedy & Co. Charles W. Wirth has been for twelve years with John R. Sulzer Sons.

NUMEROUS GOOD CONTRACTS.

John A. Roney Company, of 311 Frick building, has under way a number of good plumbing contracts, among which are the following: Washington and Jefferson College, Washington, Pa., $4,000; Pennsylvania Reform School, Morganza, Pa., $3,200; East End Carnegie Library, Pittsburg, $3,000; Washington National Bank office building, Pittsburg, $9,200; First Presbyterian Church, Sixth avenue near Wood street, Pittsburg, $3,600; Bellefield Clubhouse, Craig street, Pittsburg, $2,100.

PENNSYLVANIA

MILTON.

A large sewer will be constructed in Front street.

PERRYSVILLE.

Carson & White are plumbing the Oliver Building in Pittsburg.

WAYNESBORO.

Adams & Cline are installing a vapor heating system in a new church in Waynesboro.

UNIONTOWN.

Robinson & Walters have just completed the plumbing for the residence of Dr. Adam in that place.

BUTLER.

H. I. Connolly has been engaged some time with the plumbing for the residence of Mr. McRea in that place.

CAMPBELLFORD.

The plumbing and heating work in the residence of J. E. Diamond is being done by Morton & Owen of this town.

BRANBRIDGE.

The plumbing in the Court House and County Buildings is being done by the provincial government by day labor.

PETERBORO.

Messrs. Adamson & Dobbin have the contract for the installation of a steam heating apparatus in Mr. Neil's residence.

SWISSVALE.

Chas. M. Kitchel, of the above place, has been awarded the contract for plumbing an operation of 170 new houses in Swissvale.

ALLEGHENY CITY.

The Isherwood Plumbing Co., of East Diamond street, has been awarded the contract for plumbing the new Orphans' Home at Einsworth, Pa.

BELLEVILLE.

The heating of the parsonage of the Methodist Church is being done by the firm of John Lewis & Co. The hot water system is being installed.

GREENSBURG.

F. R. Ferguson, of this place, has recently overhauled and fitted up his establishment, where he now has on exhibition a complete line of sanitary appliances.

ALTOONA.

Ellway & Chamberlain, of 835 Eighth avenue, have been awarded the contract for installing a heating plant in a new department store in Altoona for Kline Bros.

LEWISTOWN.

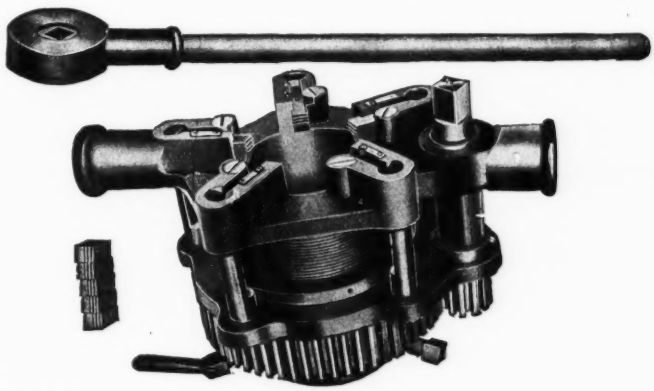
Council has passed an ordinance to submit to the vote of the people a proposition to borrow money to the amount of $100,000 for completing the sewerage system.

SCRANTON.

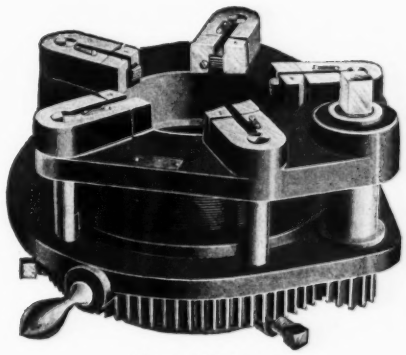
Nolan Bros., of Linden street, are installing the plumbing in twelve large flat buildings for Senator Calpin. This firm has been exceedingly busy of late with overhauling and remodeling work.

"TOLEDO" PIPE THREADER

No. 2, List $24.00.—Threads Pipe from 1 inch to 2 inch inclusive.



No. 2, List $100.00.
Threads Pipe from 2½ inch to 4 inch inclusive.



No 3, List $300.00.
Threads Pipe from 4½ inch to 8 inch inclusive.

This illustration shows
one man
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The Shaw-Kendal
Engineering Company
Plant,
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One man can easily thread
any size the tool
will cut.

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CHICAGO

MOVE UP A PEG.

Morgan & Co. have moved their office from the basement to the second floor of the Dickey building, at 40 Dearborn street, and the Doctor looks very comfortable ensconced in his new quarters. The workshop will be removed to the North Shore.

MOVE TO MORE ADVANTAGEOUS POINT.

From Room 416, 40 Dearborn street, Thomas J. Douglas & Co. have moved to 52 Dearborn street, where they have rented a portion of the large store of J. J. Wade & Son. The move is a good one, we should judge, the combination of a plumbing and a heating business under the one ceiling offering manifest advantages.

A LARGER BRANCH OFFICE STARTED.

The Chicago branch of the Louis Lipp Company, Cincinnati, which is in the Northwestern University building, Lake and Dearborn streets, has been changed to another part of the building which affords them larger and better quarters. They expect to arrange a good exhibit of their goods which the former quarters did not permit.

PLUMBING STORES AND FLAT BUILDING.

I. J. Geiss, of 544 W. North avenue, is plumbing a store and flat building at 57th and Center ave.

Wilson Bros., of 1574 Belmont avenue, are busy with the plumbing of four stores being built at 49th and Cottage Grove avenue.

F. Kendrick, of 3635 State street, is plumbing a flat building at Forrestville avenue and 43d street.

NEW HEADQUARTERS FOR CHICAGO BUILDING CONTRACTORS' COUNCIL.

Secretary E. M. Craig and a committee of the Chicago Building Contractors' Council have taken a long lease on office, committee and assembly rooms on the ninth floor of the Board of Trade building and May day will find them ready for business at the new stand. Arrangements have been made whereby nine contractors' associations will share the offices and meeting hall, this being very convenient for all concerned.

SEWER CONTRACTORS PAY THE SCALE.

It is understood that the few contractors in Chicago who make a specialty of sewer building to the exclusion of other branches of the plumbing business, met the demands of the union sewer pipe layers and are now paying their workmen twenty-five cents more per day than do the plumbers who employ union sewer pipe men only incidentally. Thus the unusual situation prevails that those who buy their labor in retail quantities get a better price than those who buy at wholesale.

ANOTHER MOVE FOR SANITARY BUREAU.

After a short sojourn on the first floor of the Chicago city hall the Sanitary Bureau has again taken up its abiding place on the ground floor. The entrance (room 23) is a bit difficult of access, but the rooms are rather pleasant and have the advantage of being near the headquarters of the Health Department, within the jurisdiction of which the work of the sanitary inspector falls. All good plumbers will remember the number and bring their plans to room 23 for the official O. K.

THEY'LL "BIDE A WEE."

The Chicago Master Plumbers' Association has given up the idea of moving out of their old rooms in the Schiller block, the arrangement for space in the Board of Trade building having fallen through, just before the signing up of a long term lease. "We aren't half badly accommodated here," says Secretary Boyd, so we'll save one-seventh of the cost of a fire by not moving.

A large room across the hall from the office has been leased as a committee room and with the addition of a little new furniture the association will soon be as snug as a bug in a rug.

KEEPING UP TO DATE.

Oliphant & Liddell, who for upward of thirty years have run a plumbing establishment at 268 West Madison street, have just finished their spring housecleaning and their store looks very fine in a new coat of paint. Messrs. Oliphant & Liddell confine their attention to custom work and have found this a winning policy. Their store is always kept up in shipshape style and evinces none of the signs of carelessness which are apt to appear when a firm has been in business many years and gets to thinking that it has a mortgage on the trade of the neighborhood. "It pays to keep up to date," is Mr. Oliphant's verdict in the matter.

NO CHANGE IN SPRINKLER SITUATION.

Both sides to the Chicago sprinkler fitters' strike seem to have settled down to a policy of delay and a settlement is apparently as far off today as it was when the union men went out a number of weeks ago.

"The men simply could not have chosen a time for striking that would have suited us better," said a prominent sprinkler contractor one day this week. "None of the contractors had much work on hand and all were amply protected against loss by strike clauses in their contracts. Of course the strike has brought about a practical shutting down of all work, but, as I say, we can well afford to shut down at this time.

"It did look for a while as though the theaters intended to comply with the new building ordinance and equip their stages with sprinkler apparatus, but as only two signed up for the work and thirty-four are still holding off, it looks as though they had got a straight tip from some source that the sprinkler clause is booked for an early repeal."

The union men are lying very low and no conferences between the employers and the union have been held for several weeks. One hundred and sixty union men are out, of which fifty are helpers. Their principal demand is for $4.50 in place of $4 per day.

DETROIT

BY MAJOR E. P. BANCROFT.

BUILDING PERMITS.

The number of permits taken out is generally considered a fair indication of the amount of building in the immediate future. It is therefore no wonder that the building trades are jubilant over the prospects in this city for the coming season.

Notwithstanding the very late spring, and the threatened labor troubles, which have retarded operations materially, the number of permits taken out in April were more than double that of the same month last year.

As we have before remarked the amount of estimated cost as given in the permit is far from accurate, as the cost reported is almost always very much below the actual cost.

Number of permits for last week in April was 51 of which the cost of 21 was given at $2,000 or more.

STAND PAT.

Not one of the members of the Employers' or Building Association has shown any signs of weakening, on the contrary new firms are constantly applying for membership.

GOOD PLUMBING JOB.

Norris & Miller, of No. 254 Randolph street, have the contract for plumbing the Dinon building, a three-story block of 7 stores on High street opposite Eastern Market.

Headquarters of the United Association. The Bush Temple of Music.

R. WILLIAMSON CHAS. E. UMMACH

TELEPHONE MAIN 2220

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ACETYLENE GAS FIXTURES AND BURNERS

MANUFACTURERS OF

Gas, Electric and Combination Fixtures

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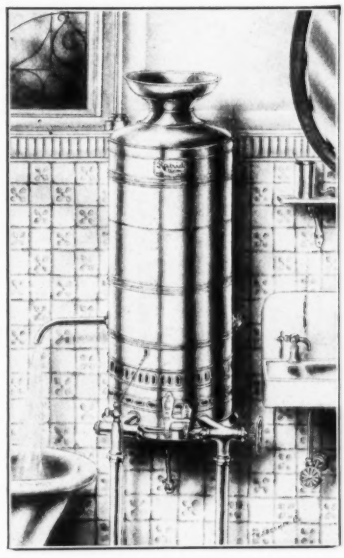

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Rapid Heater Company, Limited.
GRAND RAPIDS, MICH.

THE BEGINNING OF THE END.

During the very general discussions which have taken place within the past few months, more particularly since the organization of the employers, the question has been raised involving the legality of a contract proposed by the unions binding the employer to hire none but members of the union.

The weight of opinion seems to be that such a contract would be invalid as being against public policy.

Ever since the President of the United States decided in effect, that the Department of Printing and Engraving at Washington should be conducted as an "open shop," public attention has been more than ever directed to the enormity of the demands made by some of the unions, and the manifest injustice sought to be perpetrated. And now comes another phase of the subject which emphasizes more strongly the fact that the public is the principal sufferer in all labor disturbances, and that they must at last take matters into their own hands, and compel both sides to deal justly not only with each other, but with the great public whose interests outweigh all others.

It has been the custom of some of the departments of the city government of this city, when advertising for bids for public work, to specify that none but union labor must be employed. Of course there is no law for any such restriction, but aldermen here as elsewhere are always on the lookout for votes, and the public—well, the public is long suffering. The strike of the plumbers and steamfitters now on left a very important and intricate job on the new aquarium at Belle Isle park unfinished. Webster Harrigan & Reid of 70 State street have the contract. Every man in their employment belonged to a union and every one quit work.

Every member of the firm is a practical workman, and the two younger members put on their working suits and with such help as could be procured kept the work going without a break. Harrigan says he has smashed only one finger yet, but will smash all he has before he will be beaten. The Park Commissioner in the meantime, fearing the work would be delayed, asked the opinion of the City Attorney as to the validity of a contract excluding non-union labor. Judge McGrath, an ex-justice of the Supreme Court, gave the opinon that such a contract was invalid, and cited decisions from other states confirming this view of the case.

No organization can long exist in this country which requires for its support ex parte laws on one side and the bludgeon on the other.

If the unionists cannot sustain themselves in fair open competition with non-unionists, there is no reason for their existence.

So far as this city is concerned, the strikes are fast settling themselves. It will not be necessary to "declare them off." Except in isolated cases carpenters have all the men they want. Painters are plenty for all the work there is to do. There is no lack of help for steam fitting, this being their dull season, there are no more idle than usual. Master plumbers are clubbing together for large jobs which are pressing, while each shop is able to care for repairs, etc., for itself.

There is a cheerful and hopeful feeling prevailing generally among employers, as the contest for their rights is not likely to be as severe as they expected. The sympathy of the general public is almost entirely with the employers, now that they realize what the "closed shop" really means to them as well as the employers.

ST. LOUIS

COMPLETES RECORD BREAKING JOB.

H. T. Kilpatrick, of 1109 Pine street, St. Louis, has completed the plumbing, sewering and gas fitting of the Hotel Jefferson, in that city. This is one of the largest plumbing contracts ever let west of New York City, and the work was completed in record breaking time, in spite of the fact that the plans for the plumbing were delayed to such an extent that the roof was already on the building when Mr. Kilpatrick started the plumbing. The piping is done on the Durham system throughout, no lead being used in the building whatsoever. The entire plumbing contract was completed in a little less than six months.

There are 314 bath tubs, 500 water closets, 450 wash basins and 25 slop sinks in the building, all of which are of the latest style. All the piping for the bath rooms is exposed and is done with N. P. brass pipe. The bath rooms have marble tile floors and marble wainscoting—in fact, the plumbing of the hotel is palatial throughout.

Mr. Kilpatrick certainly deserves much credit for the rapid construction of the plumbing in this building and the workmanlike way in which the work was done. He has also several other large contracts, which he is working on, among them the contract for the plumbing of the Union Electric power house at the foot of O'Fallon street, which when completed will be one of the largest power houses west of New York City. He also has a contract for the plumbing of all the new City Hospital buildings now in course of construction. He is also plumbing a warehouse being built for the American Salt Company.

SOUTHERN NOTES.

PLUMBING SHOP DESTROYED BY FIRE.

The hardware and plumbing store of Allen Calhoun & Sons, in the new Dyer block, of Middleburg, Va., was burned last week. The insurance will probably not cover the loss.

PLUMBER INHERITS ONE MILLION DOLLARS.

After an acquaintance of fifteen years, J. Wesley Sargeant, a master plumber of Richmond, Va., and H. A. Bolles, late of Brooklyn and Rochester, retired to sleep one night recently, in Campbell's hotel, Richmond.

The next morning Sargeant came down to the hotel office and reported that his companion had died during the night. Both occupied the same bed.

At the funeral a few days later Sargeant announced that his friend was worth $1,000,000 or more, and had left a will devising the entire estate to him. Sargeant asserts that Bolles has no living relatives, and simply took a fancy to him.

Bolles was about 65 years of age and had lived in San Francisco, Buffalo, Rochester, Brooklyn, Albany and Boston. He is said to have been born in France.

RICHMOND (VA.) NOTES.

Contracts have been awarded for the completion of the office building of the Virginia State Insurance Company, at the corner of Fifth and Main streets, which was run up to the first story a year ago. Mr. N. E. Ancarrow, 724 East Main street, is the general contractor, his bid being in round figures $75,000. Jas. H. Chappell has the contract for the plumbing and steam heating at $8,000. All the subcontractors were selected from local bidders.

The contract for the new public school building near Chimborazo Park, Richmond, Va., was awarded to James Fox & Son, for $32,000. The steam heating and plumbing were not included, but were awarded separately, the former to the Smith-Courtney Company for $3,371, and the latter to W. F. Mahoney & Co. for $1,485.

Bids are all in for the new Bijou theater, but the result will not be announced until next week.

Plans are being prepared for another hotel at Virginia Beach, Va., to cost $100,000. The names of the parties interested will not be made public until the plans and specifications are ready for the bidders.

PIPEFITTERS' MINERAL CEMENT

Is a mineral product which expands and contracts to suit all conditions of piping for water, steam or gas. Can be taken apart after years of use without injury to fittings. Guaranteed to be the equal of any cement on the market. Price in 5-lb. cans, 10c. per lb. 10-lb. cans and up, 8c. per lb.

THE JOHN PORSCH CO.
1222 PEACH ST ERIE, PA.

Seasons come and seasons go, but the "Winchester" goes on forever. Each season but adds to its popularity. Never was it so easy to sell as at present. Can you, the steamfitter, afford to be without our prices? Made for either steam or hot water. Smith & Thayer Company, Boston, Mass.—Adv.

TRADE WANTS.

WANTED—SALESMEN TO CARRY AS A side line, on liberal commission basis, a new pipe cutter which cuts a pipe without a burr, and automatic wrenches. Address No. 143, care of DOMESTIC ENGINEERING, 64 North Jefferson St., Chicago, Ill. Mo.&5-14

WANTED—YOUNG MARRIED MAN, AT present employed, desires position with retail or wholesale plumbing house. Am familiar with discounts, bookkeeping, drawing plans and specifications and getting out material. California preferred, but will go anywhere. Best of references. Address E. E. Hawkins, 118 Union, Seattle, Wash. Mo. & 5-28

WANTED—CAPITAL TO INCREASE THE manufacturing of an article in the United States, Canada, and British patents, that will control the rubber hose trade for steam, air and liquids; has given perfect satisfaction for ten years; patents for improvement are pending. For illustration and description see page 340 of DOMESTIC ENGINEERING'S 1904 Directory of Jobbers and Manufacturers. Address L. T. Foreman, 1712 Douglas street, Omaha, Neb. tf

For Sale Cheap

Patterns for a full set of Durham House Drainage Fittings, Ells, Tees, T.Y's etc. If interested, will send full information and price. Address "Drainage", care of Domestic Engineering, 91 Centre St., New York

Worrell, Shinn & Co., Princeton, N. J., have some work on hand in which Cooper's goods are being used.—Adv.

DOMESTIC ENGINEERING

MONTHLY EDITION

Plumbing, Heating, Lighting, Ventilating.

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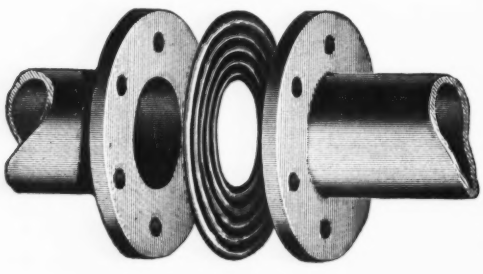
Member of the Manufacturers' Credit Co.

MAY 25, 1904



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THEY SAVE STEAM AND MAKE ABSOLUTELY TIGHT JOINTS

BEST AND CHEAPEST
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On March 12, 1904

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METER COMPANY

79 Washington Street, Brooklyn, N. Y.

Sold and Stamped Water Meter

No. 250,000

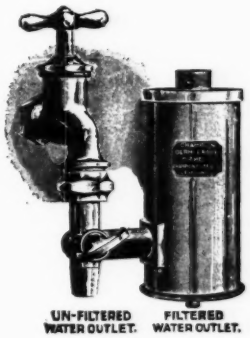
The Company has sold 50,000 water meters in 26 months.

Have a few more left for sale.

Apply for catalogue.

The Champion

Water Filter



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Is the only perfect and complete one!

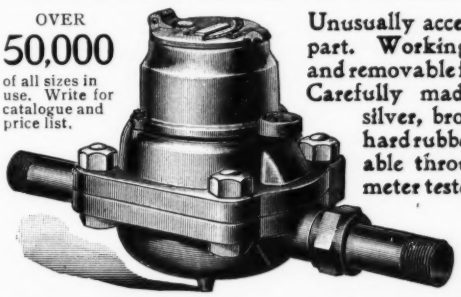
Simple, easily cleaned and operated. Fits any faucet. Catalogue and prices of complete line upon application.

The Champion Safety Lock Co.

GENEVA, OHIO.

The Niagara Water Meter

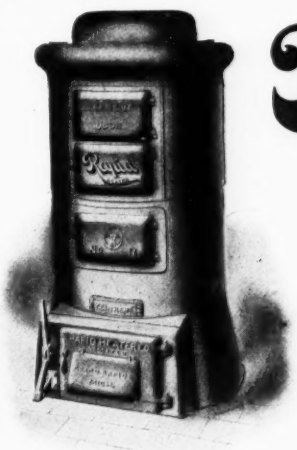
OVER 50,000 of all sizes in use. Write for catalogue and price list.



Unusually accessible in every part. Working parts separate and removable from outer case. Carefully made of German silver, bronze, brass and hard rubber. Interchangeable throughout. Each meter tested for accuracy and to a hydraulic pressure of 300 lbs. per sq. inch.

Buffalo Meter Co., 290 TERRACE, Buffalo, N. Y.

IMPROVED WILHELMI BOILER PAT. AUG 12 1890 APRIL 11 1893
THE WILHELMI
THE MODERN
TWO BEST BOILERS
The "Wilhelmi" is a high-grade copper range boiler tested to 250 pounds and guaranteed to stand a working pressure of 150 pounds. There can be no better boiler made.
The "Modern" is for use where the pressure does not exceed 100 pounds, as that is the guaranteed working pressure. It is tested to 200 pounds.
BOTH BOILERS GUARANTEED NOT TO LEAK AND AGAINST COLLAPSE
Very attractive Discounts Furnished
For Sale only by Jobbers of Plumbers' Supplies
HAYES MFG. CO., Paterson, N. J.
MODERN BOILER PAT. APRIL 11 1893



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Hot Water or Steam

"Made to heat —and do it"

All that is new and best in heater construction is in the "Rapid".

A Heater designed years ago leaving out all the good things that practice and experience have developed since, certainly can not appeal to the up to date heating engineer who wishes to give his customer the best to be had.

That's why Rapid heaters are giving universal satisfaction wherever installed.

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It will please you and your customer
Prices right—Heaters right—Why not?

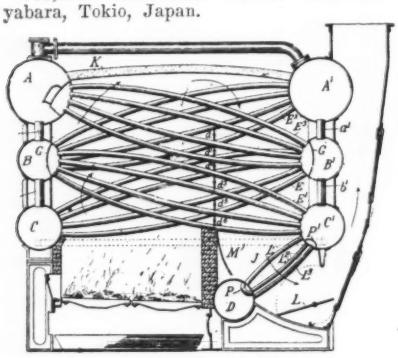
Rapid Heater Co., Limited

GRAND RAPIDS, MICH.

READ THE ADVERTISEMENTS

PATENTS AND INVENTIONS

756,179. Water-tube boiler. Jiro Miyabara, Tokio, Japan.



Muirhead & Murhard, Portland, Ore., are installing nine of Cooper's closets and a number of Cooper's lavatory fixtures in a building in that city.—Adv.

755,994. Pipe coupling; Henry Broome, Springfield, Ohio, assignor of seven-twelfths to Henry C. Pauly and James D. Boyd, Springfield, Ohio.

Trimble & Lutz Company, Wheeling, are placing Cooper's goods in some operations they have on hand.—Adv.

755,865. Oil burning apparatus; Edwin Fraser and Edward J. Hoyt, New York, N. Y.

L. C. Simpson, Camden, N. J., is placing Cooper's goods in some work he has under way.—Adv.

756,463. Blow-off Valve. Charles B. Bosworth, Somerville, Mass., assignor to Star Brass Manufacturing Company, Boston, Mass., a corporation of Massuchusetts.

P. J. Glennon, Seattle, Wash., is installing some of Cooper's fixtures in some work he has on hand.—Adv.

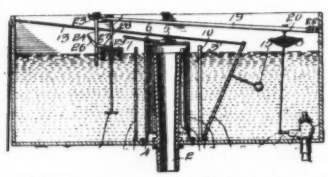
756,484. Air-pipe coupling pressure-relief valve. David W. Elliott and John B. Ruby, Newcastle, Pa.

Donnerberg & Rademacher, Portland, Ore., are using Cooper's goods in some work they have on hand.—Adv.

756,526. Stop-cock. Simon Resek, Cleveland, Ohio.

Chas. J. McCarthey, Germantown, is plumbing the residences of Mrs. Grace and Mrs. Murray, on Manheim street, using Cooper's goods throughout.—Adv.

758,970. Closet-cistern and valve therefor; Francis Jackson, Oakland, Cal.



Stephan Bros., Council Bluffs, Iowa, are placing Cooper's Nautilus closets in a residence in that city.—Adv.

756,572. Induction-valve. Percy B. Bosworth, Akron, Ohio.

Murphy & Fires, Providence, R. I., are using Cooper's goods in some work they have under contract.—Adv.

756,583. Gas-burner. Thomas E. Charlton, Cleveland, Ohio.

John H. Johnson & Co., Saginaw, Mich., are doing some plumbing work for Pere Marquette railroad, using Cooper's Nautilus closets.—Adv.

756,599. Closet-seat. La Fayette G. Dobbs, Watertown.

Wm. B. Coffee Plumbing Co., Tocoma, is installing Cooper's goods on some contracts it has on hand.—Adv.

756,624. Shut-off valve. Leon Gschwind, Akron, Ohio.

John C. Gunzer, Chestnut Hill, Philadelphia, is plumbing the residence of Mr. Patterson, using Cooper's closets, baths, lavatories and other plumbing fixtures.—Adv.

756,479. Ceiling-plate. Julius R. Drozeski, Erie, Pa.

John C. Gunzer, Chestnut Hill, Philadelphia, has the contract to plumb the residence of William Clarke, Mt. Airy, using Cooper's fixtures throughout.—Adv.

756,046. Sewer trap; Frederick Osterle, Pittsburg, Pa.

Henry McCarthey, Philadelphia, is plumbing the residence of W. B. Musser, at Ardmore. Cooper's closets, lavatories, baths, and other of Cooper's fixtures will be used in this operation.—Adv.

755,971. Tank; John W. Wallack, Brooklyn, N. Y.

Seagraves, Swoyer & Co., Allentown, Pa., are using Cooper's fixtures in some work they have on hand.—Adv.

755,925. Valve and valve-seat; Simeon R. Painter, Terre Haute, Ind.

Harry C. Worrel, Riverton, N. J., is installing some of Cooper's fixtures in some buildings in that city.—Adv.

755,922. Water closet; William H. Osborn, Louisville, Ky.

C. M. Sheldrake, Philadelphia, is using Cooper's fixtures in the residence of Mr. Lasher—Adv.

755,846. Pipe wrench; Kenton Chickering, Oil City, Pa.

Wm. F. C. Schnelle, Wheeling, is placing Cooper's goods in some work he has on hand.—Adv.

756,035. Valve; William A. Miller, Elizabeth, N. J.

G. W. Suplee, Narberth, Pa., is plumbing two residences at Ardmore, using Cooper's fixtures throughout.—Adv.

756,795. Radiator-vent. Warren W. Lower, Keystone, W. Va.

Wm. Hare's Sons, Wheeling, are placing Cooper's goods in some work they have on hand.—Adv.

756,383. Valve for radiators. Fred W. Leuthesser, Chicago, Ill.

Trimble & Lutz Company, Wheeling, are installing Cooper's goods in some operations in that city.—Adv.

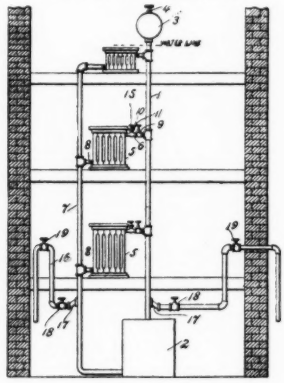
756,350. Hose-mender. Frank A. Garbutt, Los Angeles, Cal.

John F. Leary, Little Falls, N. Y., is placing Cooper's Nautilus closet in a residence in that city.—Adv.

756,346. Faucet. Michael Farrell, Chicago, Ill.

Richard T. Ford, Rochester, N. Y., is plumbing the Hudson House of Refuge, Hudson, N. Y., using Cooper's goods.—Adv.

756,282. Hot-water heating system. George L. Rankin, Greenville, Pa.



C. F. Elliott, Malvern, Pa., is plumbing the residence of Frederick A. Dreer, using Cooper's Nautilus closets, baths, lavatories and other plumbing fixtures.—Adv.

756,329. Heat-transmitting Device. William C. Clarke, New York, N. Y., assignor to Gilbert & Barker Manufacturing Company, Springfield, Mass, a corporation of Massachusetts.

Thos. Robertson & Co., Ltd., Montreal, are furnishing Cooper's goods for a residence in that city.—Adv.

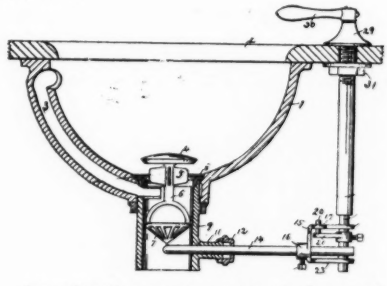
756,299. Meter. James A. Tilden, Hyde Park, Mass., assignor to Hersey Manufacturing Company, South Boston, Mass., a corporation of Maine.

Jos. Geisenberger, Philadelphia, is using Cooper's goods in some work he has on hand.—Adv.

756,257. Lavatory-basin. Harry S. Maddock and John F. Kelly, Trenton, N. J., assignors to Thomas Maddock's Sons Company, a corporation of New Jersey.

Albert Rolfe & Bro., Ft. Wayne, Ind., is placing two of Cooper's Nautilus closets in a residence in that city.—Adv.

756,663. Waste mechanism for wash-basins, baths, etc. Samuel W. Lewis, Brooklyn, N. Y.



John Bollihan, Auburn, N. Y., is remodeling the plumbing in a residence in that city, using Cooper's Nautilus closets.—Adv.

757,764. Wrench. Joseph N. Noyer, Gould City, Wash.

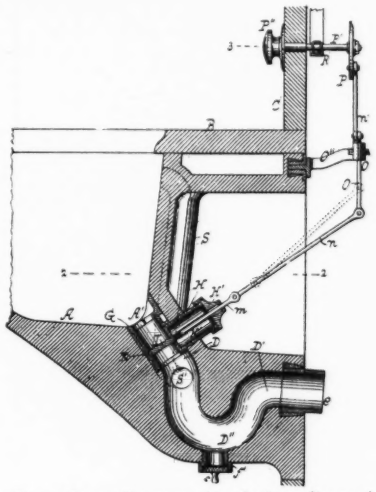
Clark Bros., Philadelphia, have some alteration work on hand in which they are using Cooper's Nautilus closets.—Adv.

John Reid, Merchantville, N. J., is plumbing the residence of Henry C. Lees, using Cooper's closets, lavatories, baths, and other plumbing fixtures.—Adv.

757,881. Reducing Valve. James J. Burke, Hartford, Conn.

Jas. Tucker & Sons Company, Boston, are using two of Cooper's Nautilus closets in some work they have on hand.—Adv.

758,040—Waste Control for Plumbing Fixtures. Edward L. Angell, New York, N. Y.



Ben Olsen, Tacoma, is placing Cooper's closets in a building in that city.—Adv.

757,738. Mechanism for operating valves of tanks for water-closets. Peter J. Gross, Brooklyn, N. Y., assignor of two-thirds to Frederick Frey and George Blank, Brooklyn, N. Y.

Corbett, Failling & Robertson, Portland, Ore., are furnishing Cooper's closets for some work in that city.—Adv.

756,909. Hot water furnace. Simon Tache, Cleveland, Ohio.

Dennis V. Kennedy, Philadelphia, is plumbing the residence of Mr. Barton, using Cooper's fixtures throughout.—Adv.

756,844. Bracket block for conduit manholes. Guy M. Gest, Cincinnati, Ohio.

Gray & Dormer, Philadelphia, are remodeling the plumbing in the United States Express Company's office, using Cooper's fixtures.—Adv.

757,313. Flexible metallic pipe coupling for railway cars. James Joynt, St. Louis, Mo.

John H. Moran, Albany, is placing Cooper's Nautilus closets in a residence in that city.—Adv.

757,590. Pressure Regulator. Barnhardt Zindel, Green Bay, Wis.

Jas. W. Partland, Detroit, is placing six of Cooper's closets in some work he has on hand.—Adv.

757,426. Apparatus for feeding neutralizing agents to steam boilers. John Noey, Braddock, and Thomas A. McGuiggan, Brinton, Pa.

Muirhead & Murhard, Portland, Ore., have some work on hand in which they are using Cooper's goods.—Adv.

757,112. Adjustable joint for water and steam pipes. Alba L. Holmes, Grand Rapids, Mich.

Gray & Dormer, Philadelphia, are plumbing the residence of Wm. H. Berger, Wyncote, using Cooper's Nautilus closets, lavatories, and other plumbing fixtures.—Adv.

Cope Pattern Works
Detroit, Mich.
Steam and Hot Water Boilers, Radiators, etc.

Parquette & Belanger are plumbing the residence of Frank A. Hardy, Derry, N. H., using Cooper's baths, lavatories, closets, showers and other plumbing fixtures.—Adv.

42,396. Pressure and Vacuum Gages. Standard Gauge Manufacturing Company, Syracuse, N. Y.

Robert Gillan, Portland, Ore., are placing Cooper's fixtures in some work they have under way.—Adv.

757,263. Water heating and steam generating device. Jesse T. Burr, Glenville, Ohio.

Mulligan & Schermerhorn, Troy, are using Cooper's goods in some work at N. Hoosick, N. Y.—Adv.

757,871. Overflow device for sinks. Earl C. Akers, Port Huron, Mich., and Robert Ross, Sarnia, Canada.

W. P. Ogelsby, Philadelphia, is plumbing a residence in Burlington, N. J., using Cooper's goods.—Adv.

759,472. Thermostat. Alfred Roesch, Bridgeport, Conn., assignor to Davis & Roesch Temperature Controlling Company, New York, N. Y., a corporation of New Jersey.

John C. Gunzer, Chestnut Hill, has some alteration work on hand in which he is using Cooper's Nautilus closets.—Adv.

757,087. Radiator valve. Adolphus L. Bower, Lima, Ohio.

T. A. Little, Wheeling, W. Va., is using Cooper's goods in some work he has on hand.—Adv.

757,130. Fitting. James J. Lawler, Mount Vernon, N. Y.

LeValley, McLeod & Co., Elmira, N. Y., are placing Cooper's Atavic Valves in the residence of Mr. Tompkins, replacing other flushing valves which failed to give satisfaction.—Adv.

757,694. Automatic Steam-Trap. Joseph M. Towne, East Orange, N. J., assignor to Safety Car Heating & Lighting Company, a corporation of New Jersey.

S. Faith & Co., Philadelphia, are plumbing the dispensary of the M. E. Hospital, using 20 of Cooper's high grade fixtures.—Adv.

36,882. Lavatory. Charles Weelans, Trenton, N. J., assignor to Monument Pottery Company, Trenton, N. J., a corporation of New Jersey.

The Waldron-Brownell Company, Bristol, R. I., are placing Cooper's Nautilus closets in a residence in that city.—Adv.

36,881. Bath Tub. Charles Weelans, Trenton, N. J., assignor to Monument Pottery Company, Trenton, N. J., a corporation of New Jersey.

McCarthey & Dowling, Philadelphia, are plumbing a residence on Green street, Germantown, for Mr. Grange, using Cooper's Nautilus closets, baths, lavatories and other plumbing fixtures.—Adv.

757,534. Ventilator. Charles A. Withers, Augusta, Ga., assignor to International Ventilator & Deflector Company, Washington, D. C., a corporation of the District of Columbia.

Newton & Gray, Philadelphia, are plumbing the banking building of the North Philadelphia Trust Company, using Cooper's fixtures throughout.—Adv.

F. J. McGarry & Bro., Philadelphia, are installing Cooper's fixtures in a residence in West Philadelphia.—Adv.

758,545—Sink Bracket. John J. Mahoney, Chattanooga, Tenn.

The Wayne Electric Light & Steam Heating Company, Wayne, Pa., are plumbing the residence of John B. Miles, St. Davids, using Cooper's closets, lavatories, baths, and other plumbing fixtures.—Adv.

757,639. Steam Generator. George L. Rose, Pasadena, Cal.

Henry McCarthy, Philadelphia, is plumbing two residences at Ardmore, using Cooper's closets, lavatories, baths, and other plumbing fixtures.—Adv.

757,873. Valve. Everett P. Allen, Chicago, Ill.

Loyal W. Dunlap, Springfield, Mass., is placing Cooper's fixtures in some work he has on hand.—Adv.

757,791. Bath-Spray. Victor C. Van't Woud, New York, N. Y.

F. J. McGarry & Bro., Philadelphia, are plumbing three residences, using Cooper's goods throughout.—Adv.

757,975. Pipe or Bar Cutter. William T. Snell, Octave, Ariz.

B. Singer, Portland, Ore., is placing Cooper's closets in some work he has on hand.—Adv.

757,502. Apparatus for Regulating the Flow of Fluids. John J. Royle, Irlam, near Manchester, England.

J. Keegan, Brookline, Mass., is placing Cooper's Nautilus closets in a residence in that city.—Adv.

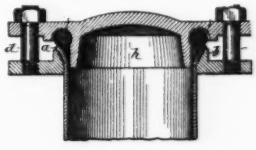
758,278—Pipe-Joint. William M. Rapp, Atlanta, Ga.

Batt & Co., Buffalo, are using Cooper's goods in some work they have on hand.—Adv.

758,436—Low-Pressure Heating System. Egbert H. Gold, Shelby, Ind.

Newton & Gray, Philadelphia, are plumbing the house of the Western Soup Society, using Cooper's fixtures throughout.—Adv.

759,081. Sealing cap for soil-pipes; William E. Delehanty, New York, N. Y.



Dennis J. Harrington, Wilmington, Del., is plumbing the residence of G. Parke Postels, using Cooper's closets, baths, lavatories and other plumbing fixtures—Adv.

758,334—Pipe-Cutter. Henry F. Renner, Erie, Pa., assignor to Hollands Manufacturing Company, Erie, Pa., a corporation.

Wm. Muirhead, Portland, Ore., is installing Cooper's fixtures in some work he has on hand.—Adv.

758,347—Water-Heater. Samuel Bernstein, New York, N. Y.

758,458—Pipe-Hanger. Charles MacTaggart, Philadelphia, Pa.

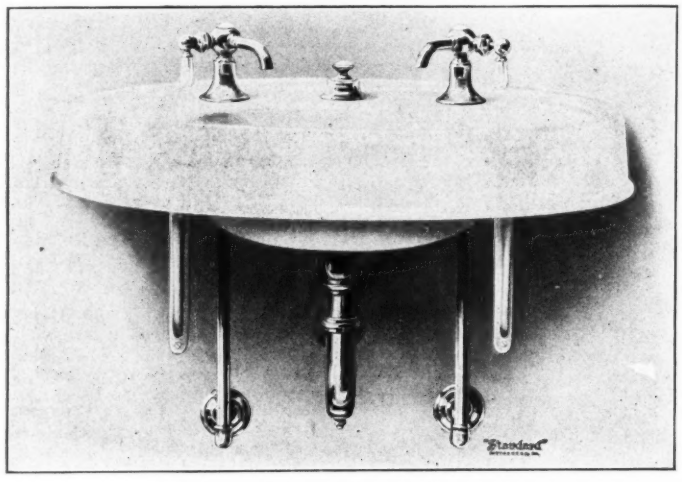
759,160. Basin-cock; Henry W. Daub and Joel K. White, Topeka, Kan.; said White assignor to said Daub.

EVER feel of any PERFECTLY PURE FLAKE GRAPHITE?
The most marvellously smooth substance known to science? If you once feel of it you'll immediately understand its great value as a lubricant. One practical test always makes practical men enthusiastic converts of "the better lubrication." Write us today for Booklet 37C and a sample.

Joseph Dixon Crucible Company, Jersey City, N. J.

"Standard" Porcelain Enameled Lavatories

will be illustrated in an unique and interesting manner in our new Catalogue "P" now on the press. The two views of the "Copley" shown below are exact reproductions from page 131, one showing the full front view and the other a side view. They tell the story.

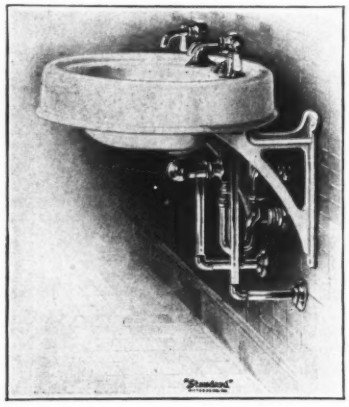


COPLEY---Plate P-503.
(Patented Nov. 24, 1903.)

"Standard" Porcelain Enameled "Copley" Design Lavatory, with Slab, Bowl and Apron all in one piece, Porcelain Enameled Brackets, Nickel-plated "Torrance" Pattern Fuller Faucets, with China Handles and Indexes, Imperial Waste with China Index, Supply Pipes and "P" Trap.

DIMENSIONS

Slab.....18x27 inches. Bowl.....11x15 inches.



Side View of Plate P-503.

Plate P-503, as described,	$37.00
Plate P-503-A, as described, less Faucets, Supply Pipes and Trap,	25.50
If with Patent Overflow, instead of Imperial Waste as shown, deduct,	4.00

¶ It was our original intention to have Catalogue "P" ready for distribution before this time, but unforeseen difficulties have delayed it. However, it is now on the press and rapidly nearing completion. Meanwhile we are preparing our catalogue list, and those who have not already made application for a copy, should write for an application card, as the edition will be limited.

Standard Sanitary Mfg. Co.

Dept. 3, Pittsburgh, U. S. A.

Alphabetical List of Monthly Advertisers

Adam, W. J. xvii
Abendroth Bros. xv
American Blower Co. i
American Machine Co. xviii
American Porcelain Co. xxxv
American Radiator Co. ..... i & ii
American Porcelain Co. xxxvi
American Radiator Co. ..... i & ii
Andrews & Johnson Co. xviii
Armstrong Mfg. Co., The xii
Asbell, S. J. Co., The xvi

Barrett, James, Mfg. Co. xxxii
Bates, D. L., & Bro. xx
Beaton & Corbin Mfg. Co. xviii
Bell, Andrew xxxiv
Benedict & Burnham Mfg. Co 308
Berger Bros. Co. xxxiv
Bernstein Co., The ..... xxxvi & xxviii
Bignall & Keeler Mfg. Co. xxxix
Borden Co. 305
Boston Brass Co. xxxii
Buffalo Meter Co. xxiii
Burns Boiler & Mfg. Co. xiv

Campbell, J. B., Brass Wks. xviii
Champion Safety Lock Co. xxiii
Clayton & Lambert Mfg. Co. i
Cope Pattern Works xxv
Crane Co. iii
Crosby Steam Gage & Valve Co i
Cudell, F. E. i
Curtis & Curtis Co. 300

Dart, E. M. Mfg. Co. xxx
Detroit Sanitary Supply Co xxxii
Dixon, Joseph, Crucible Co. ..xxv

Ellis Co., The xviii
Estabrook's, R., Sons xxxiii

Farnan Brass Works xxxi
Federal Company xxxi
Fleck Bros, Co. v
Frink, I. P. i

Glauber Brass Mfg. Co. i
Gobeille Pattern Co. i
Gorton & Lidgerwood 303
Graham, Chas., Chemical Pottery Works xxxiii
Gurney Heater Mfg. Co. vii

Hadesty, J. M. & Son xxxix
Hart Mfg. Co. xxi
Hayes Mfg. Co. xxiii
Hays Mfg. Co. xiv
Hollands Mfg. Co. xxi
Holland Radiator Co. xii
Humphrey Co. xi
Humphrey Co., F. J. xvi
Hygienic Seat Co., The ix

International Heater Co. viii

Jarecki Mfg. Co. xxi
Jenkins Bros. i

Kemp, C. M., Mfg. Co. xxxiv
Kenneth Anderson Mfg. Co. ..xiii
Kilbourne & Jacobs Mfg. Co. xxxix
Kinnear-Hood Steel Co. xv
Kinsey & Mahler Co. xvi
Knight Co., Thos. G. xvii
Kupferle, John C. xxxiii

Lausten Lead Works xxxii
Lawson Mfg. Co. xix
Lord & Burnham Co. xxii
Loomis-Manning Filter Co. xl

Mahony Mfg. Co. x
McLain, The J. H. Co. vii
McShane, Henry, Mfg. Co. xvi
Merrell Mfg. Co. xiii
Metropolitan Filter Co. i
Millar, Charles, & Son Co. xxxix
Modern Iron Works xxxiii
Monash-Younker Co. x
Monarch Water Heater Co. xix
Monitor Steam Generator Mfg. Co. xv
Moore, John T., & Bro. xxxix
Morgan & Co. xxxiv
Muckenhirn, C. H. xiii

National Radiator Co. xv
National Steam Specialty Co. xviii
Naugatuck Mfg. Co. xxxiii
Nelson, N. O., Mfg. Co. xxxvi
New York Radiator Co. xvi
Norristown Covering Co. iv
Oster Mfg. Co. xix

Parker, Charles, Co. xviii
Perkes, Charles xii
Penn Pattern Works i
Penn Pattern Works i
Perth Amboy Ceramic Co. ... xvii
Philadelphia Master Builders' Exchange xxx
Porsch, John 328
Potteries Selling Co. x

Queen & Crescent Railway ..xix
Quimby, William E., Inc. xvii

Rapid Heater Co., Ltd. ..... 327 & xxiii
Raymond Lead Co. i
Rider-Ericsson Engine Co. xxxiii
Rundle Mfg. Co. xxxiv

Sanitary Co., The vi
Sanitary Specialty Mfg. Co. ..xx
Saunders', D., Sons xxxi
Shepherd & Parker xxxiv
Shirley Radiator & Foundry Co. xx
Smith, H. B., Co. 298
Simmons, John, Co. xvii
Smooth-on Mfg. Co. i
Snyder, L. H., & Co. xviii
Sproul & McGurrin xxxiii
Stambach & Love xvii
Standard Gauge Mfg. Co. xvi
Standard Sanitary Mfg. Co xxvi
Stebbins, E., Mfg. Co. xiv
Street & Kent Mfg. Co. xxxv

Thomson Meter Co. xxiii
Toledo Pipe Threading Machine Co. 325
Trenton Potteries Co., The ..iii

Union Brass Works Co. xv
Union Supply Co. xix
United States Heater Co. 299
United States Radiator Co. xxii
U. S. Mineral Wool Co. 328
Utica Heater Co. xiv

Vapor Heating Co. xvii
Warner & Swasey Co., The ..xii
Weiskittel, A., & Son. xxxviii
Webster & Co., Warren vv
Wells, F. E., & Son xvii
Williams Tool Company ..... '
Williamson, R., & Co. 327
Wolff, L., Mfg. Co. xi

Alphabetical List of Weekly Advertisers

Alberene Stone Co., Chicago.
American Pin Co., Waterbury, Conn.
American Radiator Co., Chicago.
Armstrong Mfg. Co., Bridgeport, Conn.
Automatic Heating Co., Boston, Mass.

Babcock & Schossow Mfg. Co., Ltd., Detroit, Mich.
Beaton & Corbin Mfg. Co., Southington, Conn.
Blake & Andros, Boston, Mass.
Boston Brass Co., Boston, Mass.
Boynton Furnace Co., The, Chicago, Ill.
Bretsnyder, Wm., Chicago.

Cahill Iron Works, Chattanooga, Tenn.
Campbell, J. B., Brass Works, Erie, Pa.
Canada Metal Co., Toronto, Ont.
Canfield, H. O., Bridgeport, Conn.
Capitol Brass Works, Detroit, Mich.
Capitol Supply Co., Springfield, Mass.
Chicago, Milwaukee & St. Paul Railway, Chicago, Ill.
Clayton & Lambert Mfg. Co., Detroit, Mich.
Columbia Pottery & Mfg. Co., Kokomo, Ind.
Commonwealth Hotel, Boston, Mass.
Crane Co., Chicago, Ill.
Crane, Wm. M., Co., New York, N. Y.
Curtis & Curtis Co., The, Bridgeport, Conn.

Dart, E. M., Mfg. Co., Providence, R. I.
Davis Co., The, John, Chicago, Ill.
Davis Heater Co., Racine, Wis.
Day Metallic Mfg. Co., Detroit, Mich.
Dearborn Brass Co., The., Cedar Rapids, Iowa.
Dixon, Joseph, Crucible Co., Jersey City, N. J.
Dominion Radiator Co., Ltd., The, Toronto, Ont.
Du Bois, F. N., & Co., New York, N. Y.

Erie Railroad Co., New York, N. Y.

Fairbanks Co., The, Montreal.
Federal Co., Chicago.
Flagg, Stanley G., & Co., Philadelphia, Pa.
Fleck Bros. Co., Philadelphia, Pa.
Franklin Foundry Co., Chicago.
Froelich Bros., Philadelphia, Pa.
Froelich, Estate of A., New York, N. Y. N. Y.
Frost Mfg. Co., Kenosha, Wis.

Garratt & Co., W. T., San Francisco, Cal.
Goderich Organ Co., The, Goderich, Ont.
Greason Mfg. Co., New York, N. Y.
Great Western Pottery Co., Kokomo, Ind.
Gurney Heater Mfg. Co., The, Boston, Mass.

Harvey's, A., Sons Mfg. Co., Ltd., Detroit, Mich.
Holland Radiator Co., Chicago.
Hooper, C. N., Dubuque, Iowa.
Hygienic Seat Co., Detroit, Mich.

Iron Sanitary Mfg. Co., Chicago, Ill.

Jungblut & Co., F. G., Chicago.

Kellogg-Mackay-Cameron Co., Chicago.
Kenneth Anderson Mfg. Co., Detroit, Mich..
Kewanee Boiler Co., Kewanee, Ill.
Kilbourne & Jacobs Mfg. Co., The, Columbus, O.
King, Hodenpyl & Co., Chicago, Ill.
Knight & Jillson Co., Indianapolis, Ind.
Koven, L. O., & Brother, New York City.
Kupferle, John C., St. Louis, Mo.

Maddock, John, & Sons, Trenton, N. J.
Malbin & Kammermann, New York, N. Y.
Manz-Hollister, Chicago.
McCullough-Dalzell Crucible Co., Pittsburg, Pa.
McDermott, C. W., Boston, Mass.
Modern Iron Works, Quincy, Ill.
Morgan & Co., Chicago, Ill.
Morrison, Jas., Brass Mfg. Co., Ltd., Toronto, Ont.
Mott, J. L., Iron Works, The, New York, N. Y.
Mueller, H., Mfg. Co., Decatur, Ill.
Murray, John A., New York, N. Y.

National Brass & Metal Co., Minneapolis, Minn.
Never Split Seat Co., Evansville, Ind.
New York Radiator Co., Utica, N. Y.
Norcross Co., The, Cleveland, O.
Norristown Covering Co., Norristown, Pa.

Ohio Pump & Brass Co., The, Columbus, O.
Organ Power Co., Hartford, Conn.

Paul System Co., Boston, Mass.
Pittsburgh Valve & Fittings Co., Pittsburg, Pa.
Powers Regulator Co., Chicago.
Pratt-Chuck Co., The, Frankfort, N. Y.

Ross Valve Co., Troy, N. Y.
Rundle Mfg. Co., Milwaukee, Wis.
Ryan, J. J., & Co., Chicago, Ill.

Savill, Thomas, Philadelphia.
Simmons, John, Co., The, New York, N. Y.
Simplex Ventilator Co., Ltd., Detroit, Mich.
Smith & Anthony Co., Boston, Mass.
Smith & Egge Mfg. Co., The, Bridgeport, Conn.
Smith & Thayer Co., Boston, Mass.
Snyder, L. H., & Co., Bristol, Conn.
Speakman Supply & Pipe Co., Wilmington, Del.
Standard Gauge Mfg. Co., Syracuse, N. Y.
Standard Sanitary Mfg. Co., Pittsburgh.
Sure-Seal Trap Company, Providence, R. I.
Sylvester Bros. Mfg. Co., Lindsay, Ont.

Tay Co., George H., San Francisco, Cal.
Trenton Potteries Co., Trenton, N. J.
Trenton Brass & Machine Co., Trenton, N. J.

United States Radiator Co., Dunkirk, N. Y.

Walls & Pearsall, Philadelphia, Pa.
Waterbury Electric Co., Waterbury, Conn.
Watson Company, H. F., Erie, Pa.
Weld Co., Geo. A., Boston, Mass.
Western Tube Co., Kewanee, Ill.
Wheeling Potteries Co., Wheeling, W. Va.
White Mfg. Co., Chicago.
Wilks, S., Mfg. Co., Chicago.
Winsted Cabinet Co., Winsted, Conn.
Wirt & Knox Mfg. Co., Philadelphia, Pa.
Wright Mfg. Co., Detroit, Mich.
Wolff, L., Mfg. Co., Chicago, Ill.
Wyckoff, A., & Sons Co., Elmira, N. Y.

Young, Joseph H., Boston, Mass.

Classified List of Advertisers

Advertising.
Manz-Hollister, Chicago.

Air Valves.
Capitol Brass Works, Detroit, Mich.

Air Valve, Water Seal.
Simmons Co., John, New York.

Babbitt Metal.
Canada Metal Co., The, Toronto, Ont.

Back Water Gate Valves.
Iron Sanitary Mfg. Co., Chicago.

Ball Cocks.
Hyland Mfg. Co., W. J., Springfield, Mass.
Ohio Pump & Brass Co., Columbus, O.
Union Brass Works Co., Charlestown, Boston.

Basin Traps.
Frost Mfg. Co., Kenosha, Wis.

Bath and Basin Supply Pipes.
Sanitary Co., The, Cleveland, O.

Bath Cock and Waste.
Welskittel & Son, A., Baltimore.

Bath Room and Lavatory Furnishings.
Metropolitan Filter Co., Chicago.
Speakman Supply & Pipe Co., Wilmington, Del.

Baths, Shower.
Speakman Supply & Pipe Co., Wilmington, Del.
Standard Sanitary Mfg. Co., Pittsburg, Pa.
Street & Kent Mfg. Co., Chicago.

Bath Tubs, Iron Enameled.
McShane Mfg. Co., Henry, Baltimore, Md.
Welskittel & Son, A., Baltimore, Md.

Bath Tubs, Porcelain.
The Trenton Potteries Co., Trenton, N. J.

Bath Tubs, Steel.
Day Metallic Mfg. Co., New York.

Boiler Couplings.
Trenton Brass & Machine Co., Trenton, N. J.
Western Tube Co., Kewanee, Ill.

Boilers, Power.
Kewanee Boiler Co., Kewanee, Ill.

Boilers, Range.
Hayes Mfg. Co., Paterson, N. J.
Koven & Bro., L. O., New York.

Boilers, Steam and Hot Water.
Abendroth Bros., Port Chester, N. Y.
American Radiator Co., Chicago.
Boynton Furnace Co., Chicago.
Burns Boiler & Mfg. Co., West De Pere, Wis.
Capitol Supply Co., Springfield, Mass.
Crane Co., Wm. M., New York.
Davis Heater Co., Racine, Wis.
Gorton & Lidgerwood Co., New York.
Gurney Heater Mfg. Co., Boston.
Hayes Mfg. Co., Paterson, N. J.
International Heater Co., Utica, N. Y.
Kellogg-Mackay-Cameron Co., Chicago.
Kewanee Boiler Co., Kewanee, Ill.
Lord & Burnham Co., Irvington-on-Hudson, N. Y.
McLain Co., The J. H., Canton, O.
Mahony Mfg. Co., Troy, N. Y.
Monitor Steam Generator Mfg. Co., Landisville, Pa.
Mott Iron Works, J. L., New York.
Rapid Heater Co. Ltd., Grand Rapids, Mich.
Smith Co., H. B., Westfield, Mass.
Smith & Thayer Co., 234-236 Congress St., Boston, Mass.
United States Heater Co., Detroit, Mich.
Utica Heater Co., Utica, N. Y.
Western Tube Co., Kewanee, Ill.
Wilks Mfg. Co., S., Chicago.

Boiler Stands.
Kupferle, John C., St. Louis, Mo.
Modern Iron Works, Quincy, Ill.

Brackets for Sinks and Trays.
Young, Joseph H., Boston.

Brass Castings.
Frost Mfg. Co., Kenosha, Wis.

Brass Goods, Plumbing.
American Pin Co., Waterbury, Conn.
Campbell Brass Works, J. B., Erie, Pa.
Capitol Brass Works, Detroit, Mich.
Farnan Brass Works, Cleveland, O.
Federal Co., Chicago.
Glauber Brass Mfg. Co., Cleveland, O.
Hays Mfg. Co., Erie, Pa.
Nelson Mfg. Co., N. O., St. Louis, Mo.
Perkes, Charles, Philadelphia.
Rundle Mfg. Co., Milwaukee, Wis.
Sanitary Co., The, Cleveland, O.
Stebbins Mfg. Co., E., Springfield, Mass.
Street & Kent Mfg. Co., Chicago.
Union Brass Works Co., Boston.
Welskittel & Son, A., Baltimore, Md.

Brass, Sheet.
Benedict & Burnham Mfg. Co., Waterbury, Conn.

Brass Rods.
Benedict & Burnham Mfg. Co., Waterbury, Conn.

Brass Working Machinery.
Warner & Swasey Co., The, Cleveland, O.

Burners, Acetylene.
Crane, Wm. M., Co., New York City.

Burners, Gas.
Crane Co., Wm. M., New York.
Lawson Mfg. Co., Homestead, Pa.

Burners, Hydrocarbon.
Clayton & Lambert Mfg. Co., Detroit, Mich.

Burners, Natural Gas.
Hollands Mfg. Co., Erie, Pa.

Caps.
The McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Cellar Drainers, Automatic.
Ellis Co., The, New York, N. Y.

Cellar Drainers.
Kemp Mfg. Co., C. M., Baltimore, Md.

Cement, Smooth on Iron.
Smooth-On Mfg. Co., Jersey City, N. J.

Cleaners, Bath Tub.
Western Plumbing Supply Co., Chicago.

Cleanouts.
Barrett Mfg. Co., James, Boston.
Estabrook's Sons, R., South Boston, Mass.
Hays Mfg. Co., Erie, Pa.
McDermott, C. W., Boston, Mass

Closet Pulls.
Smith & Egge Mfg. Co., The, Bridgeport, Conn.

Closet Seats.
Hygienic Seat Co., The, Detroit, Mich.
Never Split Seat Co., Evansville, Ind.

Cocks.
Hays Mfg. Co., Erie, Pa.

Cocks, Ball.
Boston Brass Co., Boston, Mass.
Glauber Brass Mfg. Co., Cleveland, O.
Savill, Thomas, Philadelphia.

Cocks, Pet.
Clayton & Lambert Mfg. Co., Detroit Mich.

Cocks, Stop and Waste.
Campbell Brass Works, J. B., Erie, Pa.
Farnan Brass Works, Cleveland, O.
Mueller Mfg. Co., H., Decatur, Ill.

Combination Reamer and Tapping Machine.
Kenneth Anderson Mfg. Co., Detroit, Mich..

Compression Work.
Campbell Brass Works, J. B., Erie, Pa
Stebbins Mfg. Co., E., Springfield, Mass.
Street & Kent Mfg. Co., Chicago.

Couplings, Closet Repair.
Sproul & McGurrin, Grand Rapids, Mich

Couplings, Union.
Dart Mfg. Co., E. M., Providence, R. I.

Coverings, Asbestos.
Norristown Covering Co., Norristown, Pa.
Watson Co., H. F., Erie, Pa.

Coverings, Pipe and Boiler.
Norristown Covering Co., Norristown, Pa.
United States Mineral Wool Co., New York.
Watson Co., H. F., Erie, Pa.
Wyckoff & Sons Co., A., Elmira, N. Y.

Covers.
The McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Crucibles.
The McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Designing.
Jungblut & Co., F. G., Chicago.

Dies, Pipe.
Hollands Mfg. Co., Erie, Pa.

Die Stocks.
Boston Brass Co., Boston, Mass.
Curtis & Curtis Co., Bridgeport, Conn.
Oster Mfg. Co., The, Cleveland, O.
Hollands Mfg. Co., Erie, Pa.

Drainage Fittings.
Garratt & Co., W. T., San Francisco, Cal.

Drawings.
Bretsnyder, Wm., Chicago.

Drinking Fountains.
Metropolitan Filter Co., Chicago.

Earthenware, Sanitary.
Trenton Potteries Co., The, Trenton, N. J.

Ejectors.
Champion Safety Lock Co., The, Geneva, O.

Electric House Service Pumps.
Quimby, Wm. E., New York.

Electrotypes.
Jungblut & Co., F. G., Chicago.

Enameled Ware.
McShane Mfg. Co., Henry, Baltimore, Md.
Rundle Mfg. Co., Milwaukee, Wis.
Sanitary Specialty Mfg. Co., Chicago.
Standard Sanitary Mfg. Co., Pittsburg, Pa.
Wolff Mfg. Co., L., Chicago.

Engines, Hot Air Pumping.
American Machine Co., Wilmington, Del
Rider-Ericsson Engine Co., New York.

Engines, Pumping.
American Machine Co., Wilmington, Del
Rider-Ericsson Engine Co., New York.

Engravings.
Jungblut & Co., F. G., Chicago.
Manz-Hollister, Chicago.

Exhaust Steam Heating System.
Webster & Co., Warren, Camden, N. J

Fans for Mechanical Draft.
American Blower Co., Detroit, Mich.

Fan Systems of Heating and Ventilating.
American Blower Co., Detroit, Mich.

Fans, Water Motor and Electric.
Bates, D. L., & Bro., Dayton, Ohio. ..

Faucets.
Asbell Co., S. J., Paterson, N. J.
Federal Co., Chicago.
Hays Mfg. Co., Erie, Pa.

Feed Water Heaters and Purifiers.
Webster & Co., Warren, Camden, N. J.

Ferrules.
Harvey's Sons Mfg. Co., Ltd., A., Detroit, Mich.
Hays Mfg. Co., Erie, Pa.
Lausten Lead Works Chicago.
Raymond Lead Co., Chicago.

Filters, Water.
Champion Safety Lock Co., The, Geneva, O.
Loomis-Manning Filter Co., Philadelphia.
Metropolitan Filter Co., Chicago.

Fittings, Drainage.
Crane Co., Chicago.
Pittsburgh Valve & Fittings Co., Pittsburg, Pa.

Fittings, Flange.
Pittsburgh Valve & Fittings Co., Pittsburg, Pa.
John Simmons Co., New York.

Fittings, Malleable.
Flagg, Stanley G., & Co., Philadelphia, Pa.

Fittings, Pipe.
Crane Co., Chicago.
Davis Company, The John, Chicago.
Pittsburgh Valve & Fittings Co., Pittsburg, Pa.

Fixtures, Gas, Electric and Combination.
Frink, I. P., New York.
National Plumbing Supply Co., New York.
Williamson & Co., R., Chicago.

Floats, Seamless Copper Ball.
Naugatuck Mfg. Co., Naugatuck, Conn.

Floor and Ceiling Plates.
Beaton & Corbin Mfg. Co., The, Southington, Conn.
Nelson Mfg. Co., N. O., St. Louis.
Smith & Thayer Co., 234-236 Congress St., Boston, Mass.
Snyder, L. H., & Co., Bristol, Conn.

Floor Sleeves.
Andrews & Johnson Co., Chicago.

Fuller Balls.
Bell, Andrew, Newark, N. J.

Fuller Work.
Mueller Mfg. Co., H., Decatur, Ill.
Ryan & Co., J. J., Chicago.
Stebbins Mfg. Co., E., Springfield, Mass.
Street & Kent Mfg. Co., Chicago.

Furnaces, Warm Air.
Boynton Furnace Co., The, Chicago.
International Heater Co., Utica, N. Y.

Gas Appliances.
Lawson Mfg. Co., Homestead, Pa.
Williamson & Co., R., Chicago.

Gas Arc Lamps.
Bernstein Co., The S., New York, N. Y.

Gas Controllers.
Crane Co., Wm. M., New York.

Gaskets, Boiler.
Canfield, H. O., Bridgeport, Conn.

Gaskets, Corrugated Copper.
United States Mineral Wool Co., New York.

Gas Machines.
Kemp Mfg. Co., C. M., Baltimore, Md.

Gas Stoves and Ranges.
Abendroth Bros., Port Chester, N. Y.
Welskittel & Son, A., Baltimore, Md.

Gauges and Valves.
National Steam Specialty Co., Chicago.
Standard Gauge Mfg. Co., Syracuse, N. Y.

Gauges, Steam and Altitude.
Crosby Steam Gauge & Valve Co., Boston, Mass.

Graphite, Lubricating.
Dixon Crucible Co., Joseph, Jersey City, N. J.

Ground Key Work.
Hays Mfg. Co., Erie, Pa.
Mueller Mfg. Co., H., Decatur, Ill.
Stebbins Mfg. Co., E., Springfield, Mass.

Hangers, Pipe.
Beaton & Corbin Mfg. Co., The, Southington, Conn.
Jarecki Mfg. Co., Erie, Pa.
Simmons Co., John, New York.
Sproul & McGurrin, Grand Rapids, Mich.

Heating Apparatus.
Paul System Co., Boston, Mass.

Heat Regulators, Electric.
Waterbury Electric Co., Waterbury, Conn.

Heaters, Tank.
Boynton Furnace Co., The, Chicago.

Hooks, Pipe.
Berger Bros. Co., Philadelphia.

Hose Carts.
Wirt & Knox Mfg. Co., Philadelphia, Pa.

Hydrants, Yard, Fire and Wall.
Hays Mfg. Co., Erie, Pa.

Hydro Carbon Lighting Devices.
White Mfg. Co., Chicago.

Indicators.
Crosby Steam Gauge & Valve Co., Boston, Mass.

Injectors.
Champion Safety Lock Co., The, Geneva, O.

Insertable Joints.
Estabrook's Sons, R., South Boston, Mass.

Kitchen Sinks, Stone.
Norcross Co., The, Cleveland, O.

Laundry Trays.
Alberene Stone Co., Chicago.

Laundry Trays, Porcelain.
American Porcelain Co., New Brighton, Pa.

Laundry Trays, Stone.
Norcross Co., The, Cleveland, O.

Lavatories.
Froelich Bros., Philadelphia, Pa.

Lavatories, Porcelain.
American Porcelain Co., New Brighton, Pa.
Wolff Mfg. Co., L., Chicago.

Lead Pipe and Sheet Lead.
Du Bois & Co., F. N., New York.
Fleck Bros. Co., Philadelphia.
Lausten Lead Works, Chicago.
Raymond Lead Works, Chicago.

Machine Tools.
Warner & Swasey Co., The, Cleveland, O.

Marble Work for Plumbers.
Wolff Mfg. Co., L., Chicago.

Meter Boxes.
Buffalo Meter Co., Buffalo, N. Y.

Meters, Water.
Buffalo Meter Co., Buffalo, N. Y.
Thomson Meter Co., Brooklyn, N. Y.

Meters, Fuel Oil.
Buffalo Meter Co., Buffalo, N. Y.

Mineral Wool.
United States Mineral Wool Co., New York.

Nipple and Pipe Threading Machines.
Kenneth Anderson Mfg. Co., Detroit, Mich..

Nipple Machines.
Merrell Mfg. Co., Toledo, O.

Nipple Holders.
Curtis & Curtis Co., Bridgeport, Conn.

Nozzles.
The McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Packings.
Jenkins Bros., New York.
Norristown Covering Co., Norristown, Pa.

Paint, Graphite.
Dixon Crucible Co., Joseph, Jersey City, N. J.

Patents.
Shepherd & Parker, Washington, D. C.

Patterns and Models.
Cope Pattern Works, Detroit, Mich.
Gobeille Pattern Co., Cleveland, O.
Penn Pattern Works, Chester, Pa.

Phosphorizers.
The McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Pipe and Fittings, Soil.
Abendroth Bros., Port Chester, N. Y.
Franklin Foundry Co., Chicago.
Millar & Son Co., Charles, Utica, N. Y.
Nelson Mfg. Co., N. O., St. Louis, Mo.
Simmons Co., John, New York.
Wolff Mfg. Co., Chicago.

Pipe Threading and Cutting Machinery.
Armstrong Mfg. Co., The, Bridgeport, Conn.
Bignall & Keeler Mfg. Co., Edwardsville, Ill.
Borden Co., Warren, O.
Curtis & Curtis Co., Bridgeport, Conn.
Hart Mfg. Co., Cleveland, O.
Jarecki Mfg. Co., Erie, Pa.
Kenneth Anderson, Detroit, Mich.
Merrell Mfg. Co., Toledo, O.
Oster Mfg. Co., The, Cleveland, O.
Toledo Pipe Threading Machine Co., Toledo, Ohio.
Williams Tool Company, Erie, Pa.

Pipe Cutters.
Bignall & Keeler Mfg. Co., Edwardsville, Ill.
Curtis & Curtis Co., Bridgeport, Conn.
Hollands Mfg. Co., Erie, Pa.
Kemp Mfg. Co., C. M., Baltimore, Md.
Saunders Sons, D., Yonkers, N. Y.

Pipefitters' Mineral Cement.
Porsch, John, Cincinnati, O.

Pipe Joint Compound.
Dixon Crucible Co., Joseph, Jersey City, N. J.

Pipe Straps.
Berger Bros. Co., Philadelphia, Pa.
Smith & Egge Mfg. Co., The, Bridgeport, Conn.

Plumbago.
The McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Plumbers' Brass Goods.
Dearborn Brass Co., Cedar Rapids, Ia.

Plumbers' Chain.
Smith & Egge Mfg. Co., The, Bridgeport, Conn.

Plumbers' Furnace.
Murray, John A., New York, N. Y.

Plumbers' Gasoline Fire Pots and Torches.
Clayton & Lambert Mfg. Co., Detroit, Mich.

Plumbers' Rubber Goods.
Canfield, H. O., Bridgeport, Conn.

Plumbers' Supplies.
Campbell Brass Works, J. B., Erie, Pa.
Davis Company, The John, Chicago.
Du Bois & Co., F. N., New York.
Federal Co., Chicago.
Fleck Bros. Co., Philadelphia.
Hays Mfg. Co., Erie, Pa.
Knight Co., Thos. G., Brooklyn, N. Y.
Malbin & Kammerman, New York.
Millar & Son Co., Charles, Utica, N. Y.
National Brass & Metal Co., Minneapolis, Minn.
National Plumbing Supply Co., New York.
Nelson Mfg. Co., N. O., St. Louis.
New York Washer Works Co., New York.
Perkes, Charles, Philadelphia.
Rundle Mfg. Co., Milwaukee, Wis.
Simmons Co., John, New York.
Stambach & Love, Philadelphia.
Standard Sanitary Mfg. Co., Pittsburg, Pa.
Sanitary Specialty Mfg. Co., Chicago.
Tay Co., Geo. H., San Francisco, Cal.
Wolff Mfg. Co., L., Chicago.
Young, Joseph H., Boston, Mass.

Plumbers' Woodwork.
Babcock & Schossow Mfg. Co., Ltd., Detroit, Mich.
Standard Sanitary Mfg. Co. of Michigan, Detroit, Mich.
Winsted Cabinet Co., Winsted, Conn.

Pressed Steel Shop Pans.
Kilbourne & Jacobs Mfg. Co., The, Columbus, O.

Pumps.
American Machine Co., Wilmington, Del.
Modern Iron Works, Quincy, Ill.
Rider-Ericsson Co., New York, N. Y.
Wyckoff & Son Co., A., Elmira, N. Y.

Pumps, Combination Air, Force and Test.
Perkes, Charles, Philadelphia.

Radiator Shields.
Monash-Younker Co., Chicago.

Radiators, Steam and Hot Water
American Radiator Co., Chicago.
Fowler & Wolfe Mfg. Co., Philadelphia, Pa.
Capitol Supply Co., Springfield, Mass.
Gurney Heater Mfg. Co., Boston.
Holland Radiator Co., Chicago.
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Mott Iron Works, J. L., New York.
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New York Radiator Co., Utica, N. Y.
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Smith Co., The H. B., Westfield, Mass.
United States Heater Co., Detroit, Mich.
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Asbell Co., S. J., Paterson, N. J.

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Powers Regulator Co., The, Chicago.
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Trenton Potteries Co., The, Trenton, N. J

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McCullough-Dalzell Crucible Co., Pittsburgh, Pa.

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Pratt Chuck Company, The., Frankfort, N. Y.

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JNO. K. ALLEN, President.

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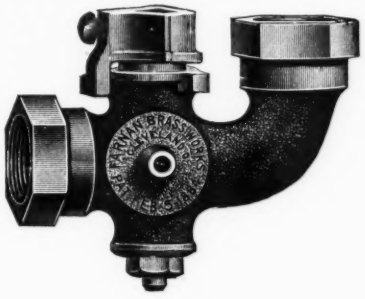

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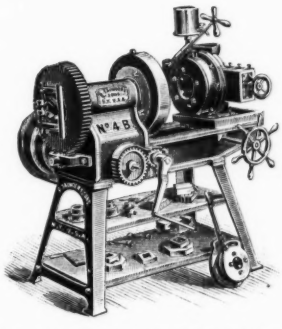

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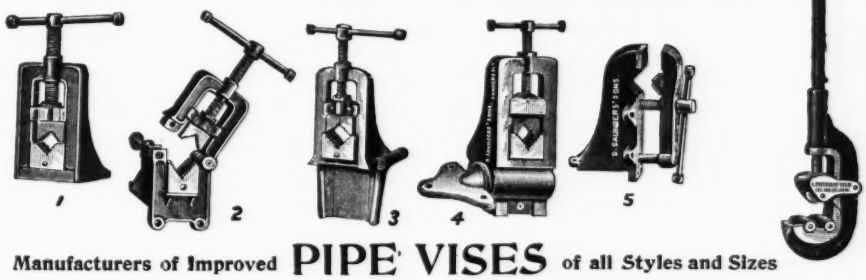

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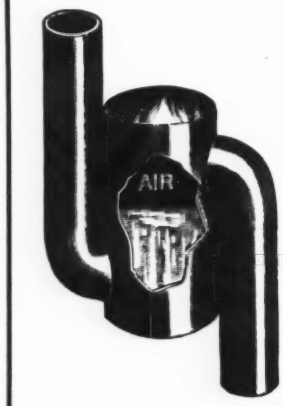

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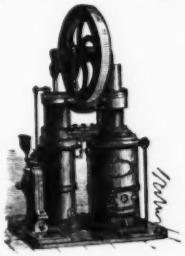

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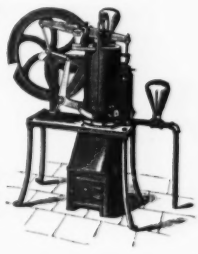

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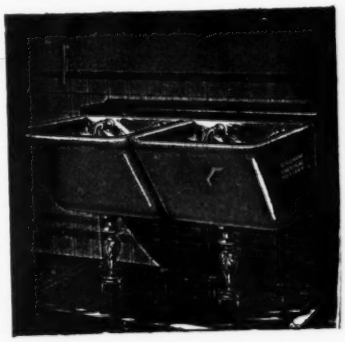

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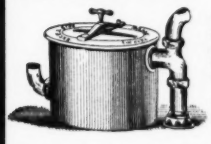

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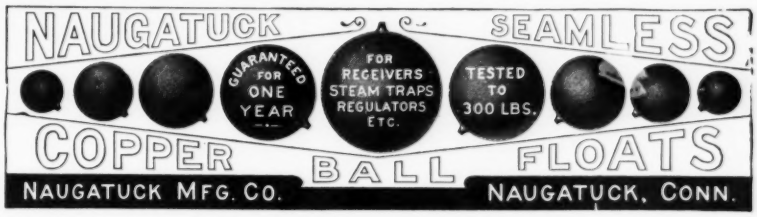

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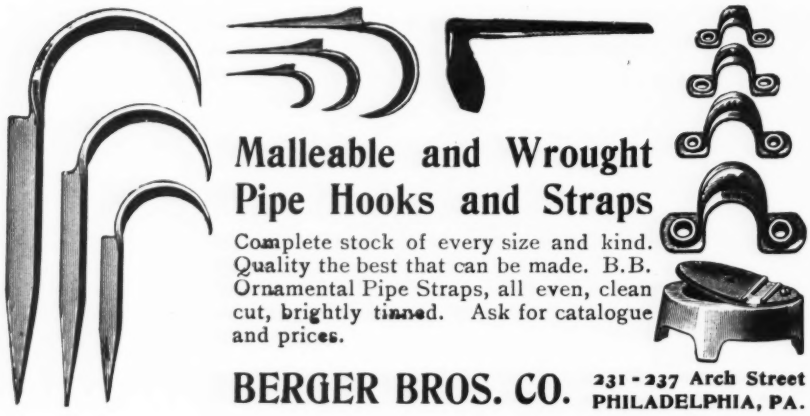

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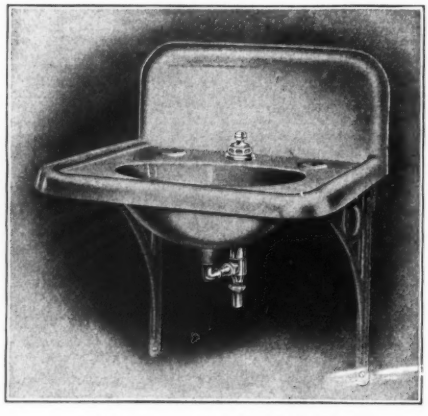

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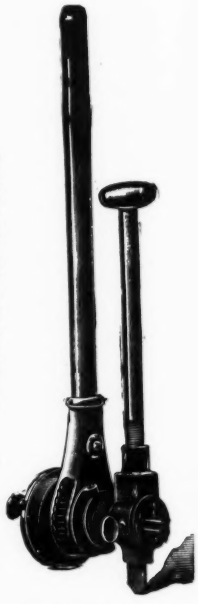

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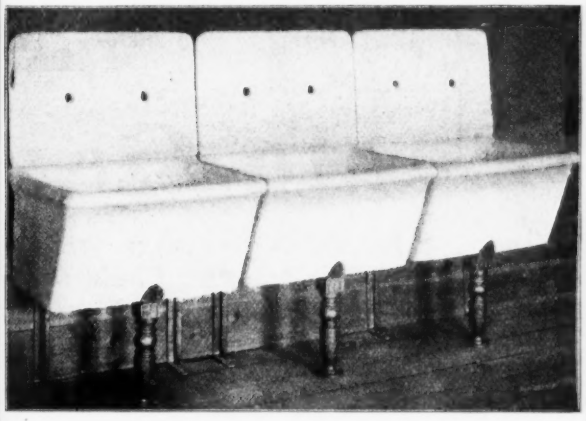

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Jobbers Attention

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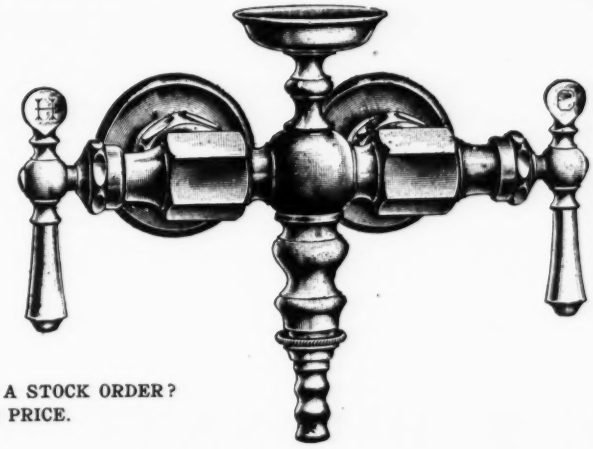

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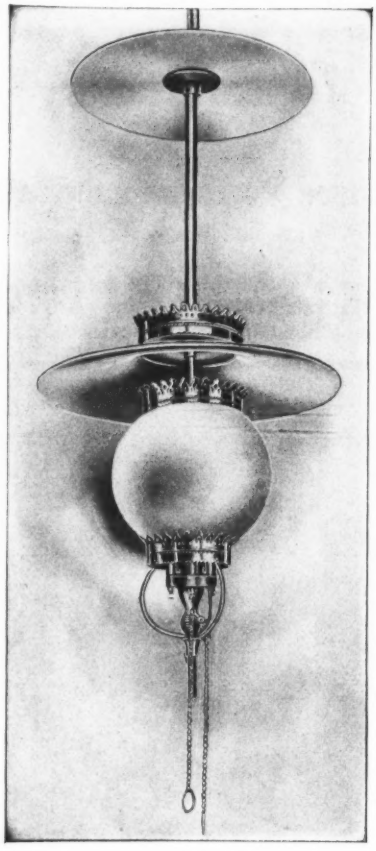
Eagle Gas Arc Lamp

A Marvel of Production for the price. The Most Artistic Designed Lamp of the Chain Pull Pattern. Every Mechanical Part Interchangeable.



THE GENERAL CONSTRUCTION

Of this lamp is entirely different from any four light cluster on the market, the body of same being made of castings, leaves no joints dependent upon a few threads on light tubing and covered with solder to give strength for transportation.

THE OBJECTIONABLE PLUG COCK

Is superseded by a Rack and Pinion movement controlling a flat ground seated valve which insures a free movement at all times regardless of any conditions it may be subjected to.

A VERY HIGH EFFICIENCY

Is obtained owing to the Superheating Gas Chamber. A feature that is not only in theory but an actual fact and readily demonstrated by a test.

THE UNIQUE GLOBE HOLDER CATCH

Will be appreciated by those whose duty it may be to maintain, as it requires but the press of your finger to lower the globe, while the replacing is simply to raise it. No set screw to bother with, hence another danger of breaking mantles removed.

THE ANXIETY TO PRODUCE LAMPS

At any price makes it most important that the buyer should be well guarded as to what material is used for the supply pipe and trimmings furnished. Iron pipe and tin trimmings oxidized will be found with many of the cheap lamps this season, whereas BRASS ONLY is used with the No. 24 EAGLE.

PRICE ON APPLICATION.

THE S. BERNSTEIN COMPANY

Manufacturers of the **Eagle**

Instantaneous Water Heaters
Incandescent Gas Burners
Gas Arc Lamps.

126-130 Sixth Avenue corner Tenth Street, New York

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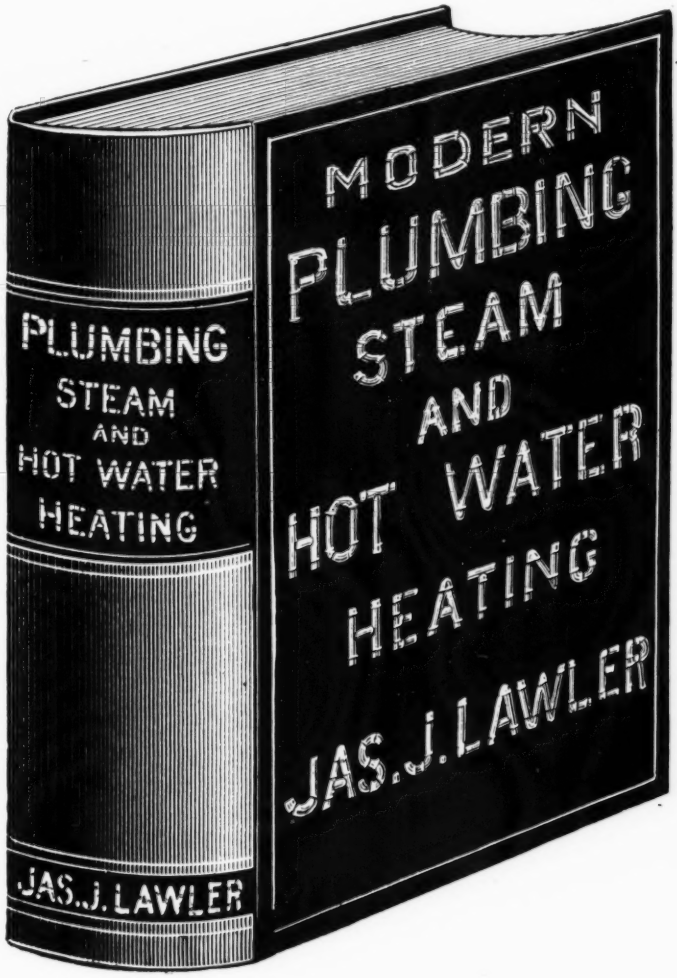

In Plumbing

It explains soil and waste pipe ventilation, back venting, the house trap, the fresh air inlet and their advantages. Siphonage of traps, the cause and how to remedy the same. How to test soil and waste pipes. Probable questions of plumbing examining boards, and answers to same. Hydraulics of plumbing, with original illustrations. Practical drawings and all important features in the construction of modern plumbing work.

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It tells how to correctly figure on any size or shape of building with steam or hot water. How to find the heating capacity of any shape or make of boiler for steam or hot water heating. The most practical timesaving tables ever compiled and published. A new table of how to quickly find the correct measurement of 45° angles, a most useful thing in steam and hot water construction. This has never before appeared in print.

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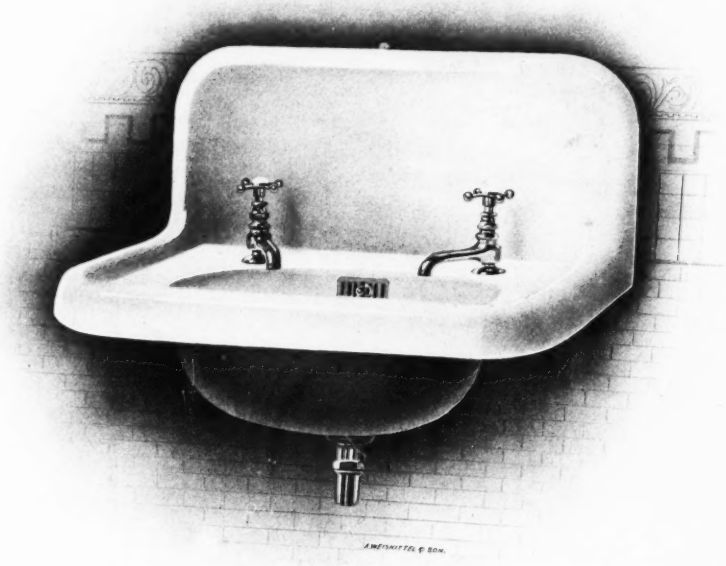

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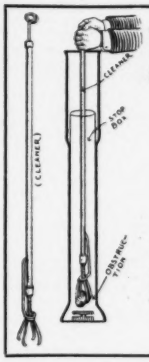

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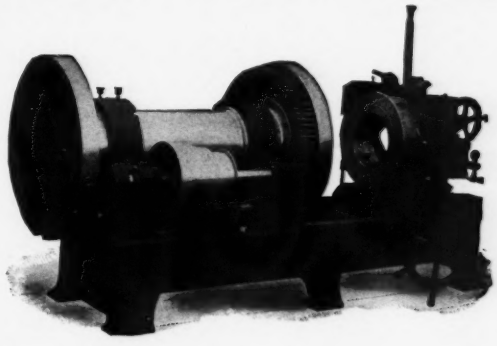

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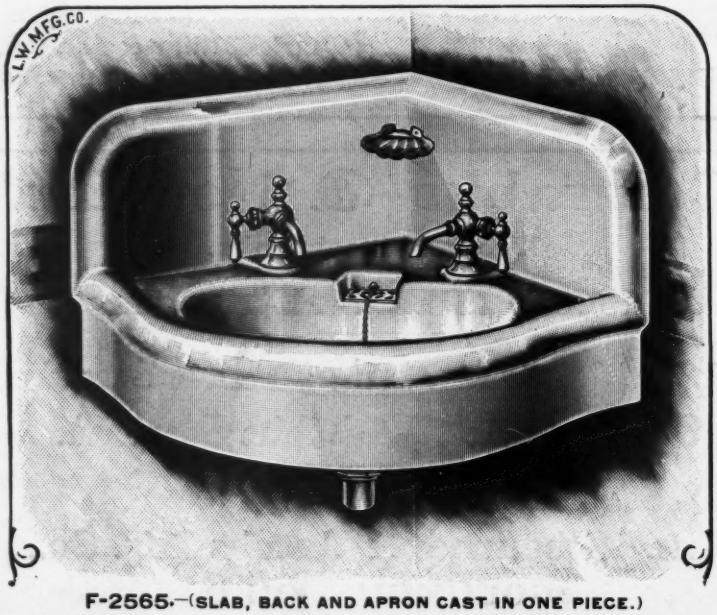

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